



FLOOD RISK ASSESSMENT

PARK GERRY REINVIGOARATION / PARK ROAD PLAYING FIELDS, CAMBORNE, CORNWALL, TR14 8QB JANUARY 2023 | PROJECT REF: 22304



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1.0 INTRODUCTION

- 1.1 MBA Consulting's Client is Camborne Town Council.
- 1.2 The Client is proposing alterations to Park Gerry. The project aims to strengthen an underutilised community asset, enhancing the spaces in order to be accessible to all, providing future-proofed community facilities within an enriched environment for generations to come. The open green space meadow character of this well-loved, local Park will be retained, with the addition of sports, games and community facilities to encourage social, health and wellbeing benefits.
- 1.3 It also aims to improve the connection of this space to others within the area, improving the visibility of the park through wayfinding within the surrounding urban environment, drawing on the heritage and culture within the area to create a sense of place and arrival.
- 1.4 Aspirational plans include the construction of a wheeled sports facility, a mixed-use games area, outdoor gym equipment and a community hub building with fully accessible public conveniences. The football pitch is to be reinstated, with better car parking provision on site and improved access and visibility from the surrounding streets to enhance cycle and walking links.
- 1.5 Other improvements also include a fully accessible perimeter path, seating areas and spaces for social gatherings. The southern meadow will retain areas for quiet reflection and dog walking within the parkland setting, with new wildflower areas, ornamental gardens and enhanced community tree planting throughout the Park.
- 1.6 The Planning Practice Guidance to the National Planning Policy Framework dated July 2021 states that a Flood Risk Assessment (FRA) is required where a proposed development is greater than 1 ha in size or in an area where the Environment Agency (EA) have indicated there may be drainage problems, i.e. Critical Drainage Areas.
- 1.7 The proposed site is larger than 1Ha and within a Critical Drainage Area. Accordingly, MBA Consulting have been commissioned to carry out a Flood Risk Assessment (FRA) to support the planning application for the proposed development.
- 1.8 This report therefore comprises a site-specific flood risk assessment and outlines the proposals for the disposal of surface water from the site.



2.0 SITE LOCATION AND DESCRIPTION

- 2.1 The site is located off Park Road, Camborne at Ordnance Survey Grid Reference (OSGR) SW 65276 40679.
- 2.2 The site is situated at approximately 100.00 AOD and is generally gently sloping from the south to the north.
- 2.3 The site currently consists of an open grassed space intersected by hedges and trees.
- 2.4 The development site area is approximately 3.7615 hectares.



FIGURE 1.0 –SITE LOCATION PLAN



3.0 EXISTING HYDROLOGY

- 3.1 The EA Drainage guidance for Cornwall CPIR Jan 2011 and Cornwall Council's Strategic Flood Risk Assessment –Level 1 (SFRA1) identifies the development to be within a Critical Drainage Area, the Camborne, Pool, Illogan and Redruth Critical Drainage Area. See Appendix A.
- 3.2 There are no known watercourses in the vicinity of the site. The Cornwall Council Strategic Flood Risk Assessment Mapping identifies a main river approximately 775.00m to the west of the site.
- 3.2 The development is elevated significantly above any watercourse or known surface water features.
- 3.3 The existing field is not actively drained and infiltrates to ground readily.



4.0 FLOOD RISK ASSESSMENT

- 4.1 The site has been assessed taking into account the Planning Policy Guidance to the National Planning Policy Framework published July 2021 and the Level 1 Strategic Flood Risk Assessment published in 2012 by Cornwall Council. The individual parameters are set out below.
- 4.2 The site is in an area designated under the Camborne, Pool, Illogan and Redruth Critical Drainage Area in the Cornwall SFRA. This requires the drainage system to comply with the Surface Water Management Plan (SWMP) published as a part of the Camborne, Pool and Redruth Integrated Urban Drainage Study commissioned by DEFRA.
- 4.3 Flooding from rivers or from the sea
- 4.4 The Environment Agency has identified the site as an area which falls outside the extent of extreme flood (please refer to extracts from the Environment Agency Flood Risk mapping in Appendix B) at the time of their assessment of the likelihood of flooding. Generally this means that the chance of flooding each year from rivers or the sea is 0.1% (1 in 1000) or less and places the development area wholly within Flood Zone 1.
- 4.5 There are no watercourses in the vicinity of the site which pose a flood risk. The Cornwall Council Strategic Flood Risk Assessment Mapping identifies a main river approximately 775.00m to the west of the site.
- 4.6 Flooding from Land.
- 4.7 The site is generally gently sloping from the south to the north. The site generally sits lower than the surrounding land on all boundaries. There is no history of flooding or overland flows onto the site from these surrounding areas. The Cornwall Strategic Flood Risk Assessment identifies the lower area of the site adjacent the northern boundary is at risk of surface water flooding during 1 in 30, 100 and 100 year events. The extent of flooding appears to be contained to the field with the aforementioned level rises at boundaries helping to contain the potential flooding. Appendix B contains the surface water flood risk map from the Cornwall SFRA showing the risk of flooding to the site in the 1 in 100, and 1 in 1000 year storms. The adjacent properties over the southern boundary are afforded a degree of protection from this surface water flooding risk due them being sited higher than the field and/or have grassed bunds to contain flood water within the confines of the field. Please refer to Photo 1.0.
- 4.8 The site is boarded on all its boundaries by residential properties. The eastern boundary appears to show a risk of surface water flooding during 1 in 100 and 100



year events. The extent of the flooding appears to be contained to the footpath from Roskear Road to the south of the site.

4.8 Directly adjacent the sites western boundary is an unmade private road used to access the rear of properties fronting Park Road. The absence of any significant areas of hardstanding here, and the unmade nature of the surface suggests there is a low risk of flooding to the site from this locale.



PHOTO 1.0 –LEVEL RISE / BUND AT NORTHEN BOUNDARY

- 4.9 Design of the surface water disposal systems within the site will be required to comply with the current 'Drainage Guidance for Cornwall –CPIR CDA' published by the Environment Agency in 2011. This will ensure that the flood risk to site and adjacent property resulting from the development of this site is minimal.
- 4.10 The site can be accessed from Trenance Road on the eastern boundary, and Park Road to the west. These roads are drained through highway drainage systems which are well maintained by the local highway authority. The topography is such that any exceedance surface water flows would be contained within the curtilage of these carriageways and pose a low risk of flooding to the site.



- 4.11 Flooding from Groundwater.
- 4.12 Wheal Jane Consultancy completed a Phase 1 Preliminary Environmental Risk Assessment on the site, reference SI121441/PH1 dated 15th November 2022. The report suggested it is unlikely that groundwater will be shallow in this area. It is anticipated that groundwater will flow to the north west.
- 4.13 Furthermore, the Cornwall Council Interactive mapping has identified the site as not being susceptible to ground water flooding. Despite the low risk of flooding from ground water, it will be imperative to undertake a regime of ground water monitoring in support of drainage proposals for the site.
- 4.14 The site has been unused/recreational land since the earliest map (1887). Three small buildings and a yard were constructed in the north of the site in 1887 but they were demolished by 1908. There was extensive mining industry surrounding the site through the 19th and 20th centuries. In 1879, there were 6 active mines and 6 inactive mines within 2000m of the site, the closest being Wheal Gerry, 150m to the West. These mines were accompanied with extensive streamworks, engine houses, shafts, heaps/tips, and railroads. The mines and other industry slowly dwindled during the 20th century, with South Crofty being the last mine to close, closing in 1998 and being marked as inactive on maps in 2016.
- 4.15 No soil infiltration testing has been completed at the site, however, the geological map indicates that the site is underlain by the Mylor Slate Formation which generally offers good soil infiltration characteristics.
- 4.16 There is no evidence that the sites historical use has resulted in the site having issues with infiltration to ground. The existing grassed field doesn't suffer from waterlogging even after prolonged periods of rain. Soil infiltration testing and ground water monitoring will need to be completed in support of drainage proposals.
- 4.17 The development proposals do not involve significant changes to existing ground levels and therefore there is low risk of flooding from groundwater.
- 4.18 Flooding from Sewers
- 4.19 The South West Water sewer record is included at Appendix C. This shows there are a number of public sewers within the vicinity of the site. The area is serviced by both surface and foul water sewers. There is a DN100 vitrified clay foul sewer located across the middle of the site running east to west, connecting to a DN150 Vitrified clay foul sewer located in the private unmade access road adjacent the sites west boundary. There is a DN150/225 vitrified clay foul water sewer adjacent to the sites southern



boundary which also connects this aforementioned DN150 vitrified clay foul sewer located in the private unmade access road adjacent the sites west boundary. This sewer in turn discharges to foul sewer in Eastern Lane to the north east of the site. Its location is suited for a new foul water connection from the proposed community hub building should it be required.

- 4.20 In addition, there is a DN150 vitrified clay public foul sewer and DN225 vitrified clay storm sewer serving the housing estate to the east of the site served by Trenance Road. The topography here aids to reduce the risk of flooding the site from these sewers with surface levels falling away from the sites east boundary in a north easterly direction.
- 4.21 The South West Water sewer record shows the head of a DN800 precast concrete surface water sewer at the sites northern boundary and running in a north easterly direction through Dorchester Court and to a DN800 precast concrete surface water sewer in North Roskear road. There is no current feature on the site which appears to discharge to this sewer. This could be a historic surface water connection from buildings which have been demolished as discussed in paragraph 4.14 here.
- 4.22 Recent changes to the application and charging process introduced by Ofwat mean that SWW no longer review sewer capacity and are obliged to fund any improvements required to the network form the infrastructure charge imposed on any development within their area of operation. Therefore, there is low risk of flooding from sewers as capacity must be made available.
- 4.23 Flooding from Reservoirs, Canals and Other Artificial Sources
- 4.24 There are no reservoirs, canals or other artificial sources in the vicinity of the development which might give rise to a risk of flooding.



5.0 SURFACE WATER DRAINAGE DESIGN STRATEGY

- 5.1 Design of the development's drainage infrastructure and Sustainable Urban Drainage System (SUDS) is to be carried out in line with best practice and to industry standard design procedures. A number of publications, including statutory instruments, design guidance and best practice guidance will apply to different components of the final infrastructure.
- 5.2 The sections below provide an overview of the design standards to be used on this project for various aspects of the surface water drainage design.
- 5.3 The design of the surface water drainage is required to follow the 'Cornwall Council CPIR SWMP Area –Drainage Standards Guidance' issued by the Environment Agency (EA) published as part of the Cornwall Council Strategic Flood Risk Assessment (SFRA). These both comply with the Planning Policy Guidance for the National Planning Policy Framework dated July 2021. Compliance is deemed to satisfy the Environment Agency in controlling the risk of flooding of and from the proposed development.
- 5.4 The site is in an area identified as a Critical Drainage Area in the Cornwall Council SFRA and within the CPIR SWMP. This requires the drainage system to comply with the 'Cornwall Council CPIR SWMP Area –Drainage Standards Guidance' included in Appendix A.
- 5.5 This requires that previously developed sites less than 1 hectare in size follow the Building Regulations hierarchy, and surface water should;
 - i. A sustainable drainage system draining to a watercourse or surface water sewer, to provide attenuation of flow, no adverse impact on water quality and where possible habitat creation. No connection to a combined drainage system will be permitted in the SWMP area.
 - Where a Flood Risk Assessment demonstrates that drainage to a watercourse or surface water sewer is not possible
 - ii. Drain to a soakaway or infiltration system designed in accordance with the SUDs Manual - CIRIA C697, using a minimum of a 30-year return period storm.

The total discharge from the site shall be no more than the theoretical greenfield runoff rates from each of the corresponding 1, 10, 30 and 100 year storms. When these values are less than 5 litres/second, a rate of 5 litres/second can be used.



The design must take into account the appropriate allowance for increased rainfall from climate change. This should be based on the lifetime of the development, the guidance in Annex B of PPS25 and the PPS25 Practice Guide.

Surface water should be stored at the surface in ponds and swales. If this is not possible for technical reasons Underground attenuation and piped sections should be designed for a minimum of the 30-year storm. However total discharge rates from the site must still be controlled from the 100-year storm at the greenfield run-off rate from the 100 year storm. Attenuation of events exceeding the piped system may be achieved by temporary flooding of open spaces or car parks. If surface flooding of open areas is not appropriate, the formal drainage system should be designed to accommodate the 100 year storm.

Safe and appropriate flow routes from blockage and exceedance of the drainage system must be evaluated. This must demonstrate no property flooding or increase in flood risk, either offsite or to third parties.

- 5.6 As mentioned previously in this report (paras 3.2 and 4.5) there are no watercourses in the vicinity of the site. In addition, South West Water are requesting development proposals to discharge surface run-off as high up the surface water runoff destination hierarchy of drainage options as reasonably practicable, with discharge into the ground (infiltration techniques) the most preferred approach. In these circumstances the Lead Local Flood Authority (LLFA –Cornwall Council), can support a departure from the standard guidance is surface water from the site can be discharge though infiltration techniques such as drainage blankets. Drainage blankets are a preferred method of surface water disposal when compared to soakaways as they don't 'point load' a particular location and are more representative of a natural regime where there is direct discharge to ground from rainfall.
- 5.7 This approach works particularly well for the proposals for the site which include a number of permeable finished surfaces such as the reinstated football pitch, mixed-use games area and carparks. Infiltration storage will be provided within the sub-base makeup of these surfacing constructions.
- 5.8 New paths will be drained either through permeable surfacing or drain over the edge to linear French drains along the path edges. Again this method is representative of an natural existing regime where there is direct in-situ discharge to ground from rainfall.
- 5.9 The proposed community hub building (approx. 110.0m²) and the wheeled sports facility (approx. 1445.0m²) will need to adopt infiltration strategies similar to mentioned above which avoid point loading a particular location. The features employed could



include drainage blankets and/or long linear French drains/soakaways surrounding the proposed areas.

- 5.10 Underground attenuation and piped sections will be designed for a minimum of the 100-year storm.
- 5.11 The surface water drainage design will take into account future climate change as outlined within Technical Guidance for the National Planning Policy Framework. This recommends that a 40% increase in the rainfall intensities be allowed for future climate change over the next 100 years. However, Recent changes to guidance from the Lead Local Flood Authority (LLFA) look to utilise a 50% climate change allowance. This will be considered within the drainage design for each of the corresponding 1, 30, 100-year storms.
- 5.12 The detailed design of the drainage systems will need to be submitted to the LLFA for approval prior to construction. It should include at that stage the following information.
- A description of the foul and surface water drainage systems operation
- Details of soil infiltration testing and ground water monitoring.
- Details of the final drainage schemes including calculations and layout
- A Construction Environmental Management Plan
- A Construction Quality Control Procedure
- A plan indicating the provisions for exceedance pathways, overland flow routes and proposed detention features
- A timetable of construction including a plan indicating the phasing of development including the implementation of the drainage systems
- Confirmation of who will maintain the drainage systems and a plan for the future maintenance and management, including responsibilities for the drainage systems and overland flow routes



6.0 CONCLUSIONS AND RECOMMENDATIONS

- 6.1 The flood risk has been assessed following the principals of National Planning Policy Framework and the level 1 Strategic Flood risk Assessment for Cornwall. It is concluded that the proposed development of the site does not significantly increase the risk of flooding offsite and the site is not considered to be at significant risk of flooding.
- 6.2 It is further concluded that the design of a surface water drainage system using the principles of SUDS and compliant with the requirements of the Cornwall Strategic Flood Risk Assessment is achievable within the confines of the site.



Dated: January 2023

Signed...... MARK POWELL EngTech. TMICE FOR AND ON BEHALF OF MBA CONSULTING



APPENDIX A



May 2015

Critical Drainage Area (CDA)

Cornwall – CPIR – Camborne, Pool, Illogan and Redruth





Catchment Drainage / Flooding Issues

Cornwall Council's Local Flood Risk Management Strategy (Strategy) identifies Camborne, Pool and Redruth as Priority Communities. A Surface Water Management Plan (SWMP) has been developed for the Camborne, Pool, Illogan and Redruth (CPIR) areas in response to the proposed growth in the area and current drainage constraints. This requires that in addition to controlling run-off from development there is the need for offsite infrastructure changes. Further actions to address flood risk should be developed in partnership through the Strategy.

The drainage standards in the CPIR Catchment are different to those used in the other Critical Drainage Areas.

The Local Plan is proposing 4,500 new dwellings between 2010 and 2030 in CPIR together with new commercial development and infrastructure. To facilitate this scale of development and to ensure flood risk and water quality are appropriately managed the SWMP proposes methods to manage surface water drainage within the CPIR area.

The aim is that the redevelopment of brownfield sites will remove surface water from the combined (foul and surface water) sewer system. This will free capacity in the foul drainage system which is required to serve the proposed development.

Infiltration drainage is not the preferred drainage option in this catchment because of the presence of mine workings and contaminated land. Clean surface water entering mine systems can contribute to contaminated water from mines polluting downstream watercourses.

Continued



Catchment Drainage / Flooding Issues (continued)

The SWMP is proposing a network of surface water leats that new development can connect to for surface water disposal. In areas where leats are not viable or available new surface water sewers will be required.

The leats will link between development sites and existing watercourses and will be designed to maximise environmental and recreational benefits, while managing flood risks by providing areas for surface water storage.

Minimum Drainage Standards Required

All new development will have to play their part in reducing current rainfall runoff rates. This requirement also applies to brownfield sites that will have to match the same standards. There is a presumption in favour of draining surface water to a watercourse, or surface water sewer and all off-site surface water discharges from development should mimic greenfield discharge rates.

If it is deemed unviable to drain to a watercourse or surface water sewer draining surface water by infiltration can then be assessed.

On site all surface water should be safely managed up to the 1 in 100 year plus climate change conditions.

Surface water from new development should not be routed into a combined sewer as capacity in this system is required for new foul water connections. Additional surface water in the combined drainage system can adversely affect water quality and contribute to failure of Water Framework Directive objectives and negatively impact bathing water quality.





Cornwall Council Critical Drainage Areas - Drainage Standards Guidance

Revised January 2010

This sheet outlines the drainage standards we expect to be achieved. These should be read in conjunction with an individual catchment guidance sheet which provides a map of the Critical Drainage Area and outlines the reasons for considering it as a Critical Drainage Area.

Small Development Sites

Development of 1-3 dwellings

Following the Building Regulations Drainage hierarchy, surface water should:-

i. Drain to a soakaway or infiltration system designed in accordance with the SUDS Manual - CIRIA C697, using a minimum of a 30-year return period storm.

Where a Flood Risk Assessment demonstrates that infiltration is not possible:-

ii. A sustainable drainage system should be provided discharging at a rate not exceeding 1.5 litres/second per dwelling, with attenuation provided up to the 30-year storm.

(Products exist that allow individual properties to restrict run-off to this rate, using private underground storage tanks. A discharge of 1.5 litres/second is typically achieved on the commercially available systems using a proprietary device on the outlet with an orifice of around 30mm. This is combined with a sediment trap and a filter to prevent blockage. Storage is provided on the property in an underground tank or crate system, operating with a maximum depth of water of approximately 500mm. The size of the tank will need to be based on the impermeable area draining to the system. It should be noted that due to the small orifice size these systems would remain in private ownership as they are unlikely to be adopted.)

The design must take into account the appropriate allowance for increased rainfall from climate change, based on the lifetime of the development, the guidance in Annex B of PPS25 and the PPS25 Practice Guide. This is currently an increase in rainfall intensity of 30%.

Safe and appropriate flow routes from blockage and exceedance of the drainage system must be evaluated. This must demonstrate no property flooding or increase in flood risk either offsite or to third parties.

Previously Developed Sites

Operational development less than 1 hectare

Following the Building Regulations Drainage hierarchy, surface water should:-

i. Drain to a soakaway or infiltration system designed in accordance with the SUDS Manual - CIRIA C697, using a minimum of a 30-year return period storm.

Where a Flood Risk Assessment demonstrates that infiltration is not possible:-

ii. A sustainable drainage system shall be provided ensuring flow attenuation, no adverse impact on water quality and where possible habitat creation.

The total discharge from the site shall be no more than the theoretical greenfield run-off rates from each of the corresponding 1, 10, 30 and 100 year storms. When these values are less than 5 litres/second, a rate of 5 litres/second can be used. Attenuation may not be necessary if the discharge is directly to coastal waters. In these cases the impact on the receiving environment in terms of habitat, erosion and water quality should be assessed.

The design must take into account the appropriate allowance for increased rainfall from climate change. This should be based on the lifetime of the development, the guidance in Annex B of PPS25 and the PPS25 Practice Guide.

Underground attenuation and piped sections should be designed for a minimum of the 30year storm. However total discharge rates from the site must still be controlled from the 100-year storm at the greenfiled run-off rate from the 100 year storm.. Attenuation of events exceeding the piped system may be achieved by temporary flooding of open spaces or car parks. If surface flooding of open areas is not appropriate, the formal drainage system should be designed to accomodate the 100 year storm.

Safe and appropriate flow routes from blockage and exceedance of the drainage system must be evaluated. This must demonstrate no property flooding or increase in flood risk, either offsite or to third parties.

Operational development equal to or greater than 1 hectare

Meet the standards for a development less than 1 hectare as outlined in C2 above.

Where infiltration is not used, <u>long-term storage</u> must be provided to store the <u>additional</u> <u>volume</u> of run-off caused by any increase in impermeable area. This is in addition to the attenuation storage required to address flow rates, see <u>Appendix F</u>. Alternatively rainwater harvesting can be used to offset this volume.

The long-term storage should discharge at a rate not exceeding 2 litres/second/hectare, as per *Preliminary rainfall run-off management for developments DEFRA / Environment Agency guidance W5-074 Revision D.*

Greenfield Sites

Operational development less than 1 hectare

Following the Building Regulations Drainage hierarchy, surface water should:-

i. Drain to a soakaway or infiltration system designed in accordance with the SUDS Manual - CIRIA C697, using a minimum of a 30-year return period storm.

Where a Flood Risk Assessment demonstrates that infiltration is not possible:-

ii. A sustainable drainage system shall be provided ensuring flow attenuation, no adverse impact on water quality and where possible habitat creation.

The total discharge from the site shall be no more than the theoretical greenfield run-off rates from the corresponding 1 and 10 year storms. For the 30 and 100 year storms, the total discharge from the site should not increase further but should also be restricted to the run-off rate for the 10 year storm. When these values are less than 5 litres/second, a rate of 5 litres/second can be used. Attenuation may not be necessary if the discharge is directly to coastal waters. In these cases the impact on the receiving environment in terms of habitat, erosion and water quality should be assessed.

The design must take into account the appropriate allowance for increased rainfall from climate change. This should be based on the lifetime of the development, the guidance in Annex B of PPS25 and the PPS25 Practice Guide.

Underground attenuation and piped sections should be designed for a minimum of the 30year storm. However the total discharge rates from the site must still be controlled from the 100-year storm at the greenfield run-off rate from the 10 year storm. Attenuation of events exceeding the piped system may be achieved by temporary flooding of open spaces or car parks. If surface flooding of open areas is not appropriate, the formal drainage system should be designed to accomodate the 100 year storm.

Safe and appropriate flow routes from blockage and exceedance of the drainage system must be evaluated. This must demonstrate no property flooding or increase in flood risk, either offsite or to third parties.

Operational development equal to or greater than 1 hectare

Meet the standards for a development less than 1 hectare as outlined in C3 above.

Where infiltration is not used, <u>long-term storage</u> must be provided to store the <u>additional</u> <u>volume</u> of run-off caused by any increase in impermeable area. This is in addition to the attenuation storage required to address flow rates, see <u>Appendix F</u>. Alternatively rainwater harvesting can be used to offset this volume.

The long-term storage should discharge at a rate not exceeding 2 litres/second/hectare, as per *Preliminary rainfall run-off management for developments DEFRA/Environment Agency guidance W5-074 Revision D.*



APPENDIX B



Flood map for planning

Your reference 22304

Location (easting/northing) 165293/40634

Created **5 Jan 2023 14:12**

Your selected location is in flood zone 1, an area with a low probability of flooding.

You will need to do a flood risk assessment if your site is any of the following:

- bigger that 1 hectare (ha)
- In an area with critical drainage problems as notified by the Environment Agency
- identified as being at increased flood risk in future by the local authority's strategic flood risk assessment
- at risk from other sources of flooding (such as surface water or reservoirs) and its development would increase the vulnerability of its use (such as constructing an office on an undeveloped site or converting a shop to a dwelling)

Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.

Flood risk data is covered by the Open Government Licence **which** sets out the terms and conditions for using government data. https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/

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APPENDIX C



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