Barratt Redrow

Offsite Fire Risk Assessments

An Oregon perspective

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Oregon
TIMBER FRAME ENGINEERING

Offsite Fire Risk Assessments

Agenda

- Who are Oregon Timber Frame?
- What is an Offsite Fire Risk Assessment?
- Why is this important for those building timber frame?
- STA Separating Distance Guidance
- High level process
- Example of assessment & concepts – multi unit housing site
- Common Myths
- Golden Rules

Who are Oregon Timber Frame?

Abridged

- Timber frame supplier, specialising in the residential sector, founded in 1998 in the Scottish Borders.
- Acquired by Barratt Developments plc (now Barratt Redrow plc) in Summer 2019 to supply timber frame solely to their business.
- Production facilities expanded in Selkirk and Derby.
- Geographical operating area covers the majority of Scotland, England and Wales.
- Currently deliver approx. 5000 units over 100 sites. Capacity to be around 9000 units.

Oregon
TIMBER FRAME ENGINEERING

What is an Offsite Fire Risk Assessment?

- An offsite risk assessment considers fire spread and the risk to people and property beyond the site boundary and outside of the control of the principal contractor, that could be possible **during construction** of new *timber frame* buildings.
- CDM (2015) – Clause 29

Prevention of risk from fire, flooding or asphyxiation

29. Suitable and sufficient steps must be taken to prevent, so far as is reasonably practicable, the risk of injury to a person during the carrying out of construction work arising from—

(a) fire or explosion;

(b) flooding; or

(c) any substance liable to cause asphyxiation.

- HSG 168 (2022) – Paragraphs 341-355

344 The off-site assessment must:

- consider the risk of a fire from within the site boundary spreading to properties outside the site boundary;
- consider the occupiers of any nearby properties, their ability to escape and their escape route in case a fire occurs; and
- identify fire mitigation measures, such as use of timber frame with appropriate fire resistance, which are required to reduce the off-site risk to an acceptable level.

Why is this important for timber frame?

History

- Notable high profile timber frame apartment fires during construction – put the suitability of timber frame into question. The industry had to act.

JULY 2006 – COLINDALE, NORTH LONDON –

Six-storey timber-framed block totally destroyed in 9 minutes. The blaze also destroyed a second block in construction and spread to a student halls of residence. Hendon Police College on the other side of a road suffered damage, 30 cars were written off and 2,500 people had to be evacuated.

NOVEMBER 2009 – PECKHAM, SOUTH LONDON –

Destroyed block under construction, the evacuation of more than 300 people and serious damage to two nearby blocks of maisonettes and a pub.

Why is this important for timber frame?

Industry response

- From 2011 the UKTFA (now the Structural Timber Association (STA)) worked to develop guidance for reducing the impact of site fires and ensure containment within the site boundary.
- Key outputs include:
  - Site Safe portal and process mandatory for STA members
  - 16 steps to fire safety
  - Separating distance guidance
  - PP5: Separating distance guidance for buildings under 250m^2

STA Separating Distance Guidance

- Simple guidance for standard sites
- Separating Distance required (Sr) based on new timber frame:
  - Area
  - Length of elevation facing existing building (eL)
  - Number of storeys
- Standard categories for enhanced fire mitigated solutions (Oregon preferred to side)

Separation distance tables for projects 250m² or less

Table A

Buildings 250m² or less total floor area, standard open panel timber frame, Category A frame up to 3m storey height.

Minimum separating distances (Sr) in metres

No. of Storeys	Emitter length (eL)											
	4m	5m	6m	7m	8m	9m	10m	11m	12m	14m	18m	20m
1	3.0	3.0	3.0	3.1	3.3	3.4	3.4	3.5	3.5	3.6	3.7	3.8
2	3.4	3.9	4.3	4.7	5.0	5.2	5.5	5.7	5.9	6.2	6.7	6.8
3	4.5	4.5	5.0	5.5	6.0	6.4	6.8	7.1				

Extract from STA PP5

BUFFER/STAND OFF PLOTS:
DO NOT OCCUPY UNTIL THE MASONRY BUILT, DRYLINED AND SCAFFOLD DOWN TO ADJACENT PLOTS WITHOUT FURTHER MITIGATION.

VERTICAL SEPARATION FRAMES REQUIRE:
- NON-COMBUSTIBLE BOARD TO BE FITTED TO GABLE EX PANELS AND RETURNED 1200mm OR TO OPENING (WHICHEVER COMES FIRST).
- ANY OPENINGS WITHIN THE GABLE PANELS TO BE PROVIDED WITH INFILL PANELS AND NON-COMBUSTIBLE BOARD.

CATEGORY B FRAMES REQUIRE:
- ALL OSB TO EXTERNAL, PARTY AND LOAD BEARING WALLS TO BE REPLACED WITH NON COMBUSTIBLE BOARD.
- OSB TO FLOOR CASSETTE TO BE REPLACED WITH FR TREATED OSB.

CATEGORY C1 FRAMES REQUIRE:
- ALL OSB TO EXTERNAL, PARTY AND LOAD BEARING WALLS TO BE REPLACED WITH NON-COMBUSTIBLE BOARD.
- I-JOISTS TO BE REPLACED WITH FR TREATED SOLID JOISTS.
- OSB TO FLOOR CASSETTE TO BE REPLACED WITH FR TREATED OSB.

CATEGORY C2 FRAMES REQUIRE:
- ALL OSB TO EXTERNAL, PARTY AND LOAD BEARING WALLS TO BE REPLACED WITH NON-COMBUSTIBLE BOARD.
- I-JOISTS TO BE REPLACED WITH FR TREATED SOLID JOISTS.
- OSB TO FLOOR CASSETTE TO BE REPLACED WITH FR TREATED OSB.
- OPENINGS TO BE PROVIDED WITH INFILL PANELS AND NON-COMBUSTIBLE BOARD.

FIRE ENGINEERED PLOT SPECIFIC SOLUTION:
- AS REQUIRED BY PLOT SPECIFIC FIRE ENGINEER ASSESSMENT

High Level Process

Considering Offsite Fire Risk throughout the development

1

Division to proceed in Timber Frame

- Division identify Offsite fire Risks / constraints / considerations.
- Division assesses whether risks can be mitigated.
- Early stage design changes implemented to assist.

2

Pre-Design Tasks, Enquiry, Quotation and Order

- Division provide site specific information to timber frame (TF) supplier.
- TF supplier reviews and provides quotation.

3

Develop Site Specific Design & Pre-Site Start

- Division finalise Execution Plan with prescribed information.
- Review if timber frame supplier or Fire Engineer to review, dependent on attitude to risk.
- Execution Plan issued to relevant party.
- FM Assessment and OSFRA developed by TF Supplier/Fire Engineer.
- If Fire Engineer report checked then issued to TF supplier.
- TF supplier registers with STA Site Safe.
- Division completes relevant on site fire risk assessments.

4

Construction Phase

- Division reviews FM Assessment/Offsite Fire Risk Assessment to ensure still accurately reflects site and nearby conditions.
- Site commences.
- Review by Divisional site team intervals not exceeding 3 months, or if there are significant changes.
- Regular reviews completed by Divisional Safety Manager.
- Any changes highlighted and TF supplier and if relevant Fire Engineer notified.
- FM assessment/Offsite Fire Risk Assessment updated as required.

5

Site Closure

- Site Exit strategy implemented.
- Site finish updated STA Site Safe.

Example Offsite Fire Risk Assessment

Execution Plan

Once order in place the Division is to provide Oregon with an accurate site execution plan based on to scaled digital site layout showing:

- TF delivery route of all houses/apartments on the site/phase.
- Plot numbers.
- Housetype names.
- Highlighting nearby offsite buildings.
- Remember once a plot is sold it is classed as off site from a fire mitigation point of view.
- If known preferences for buffer/stand off plots.
- Show homes are classed as occupied buildings as they are used by members of the public.
- Location of site offices/accommodation.

Execution Plan Extract

Example Offsite Fire Risk Assessment

Site Location

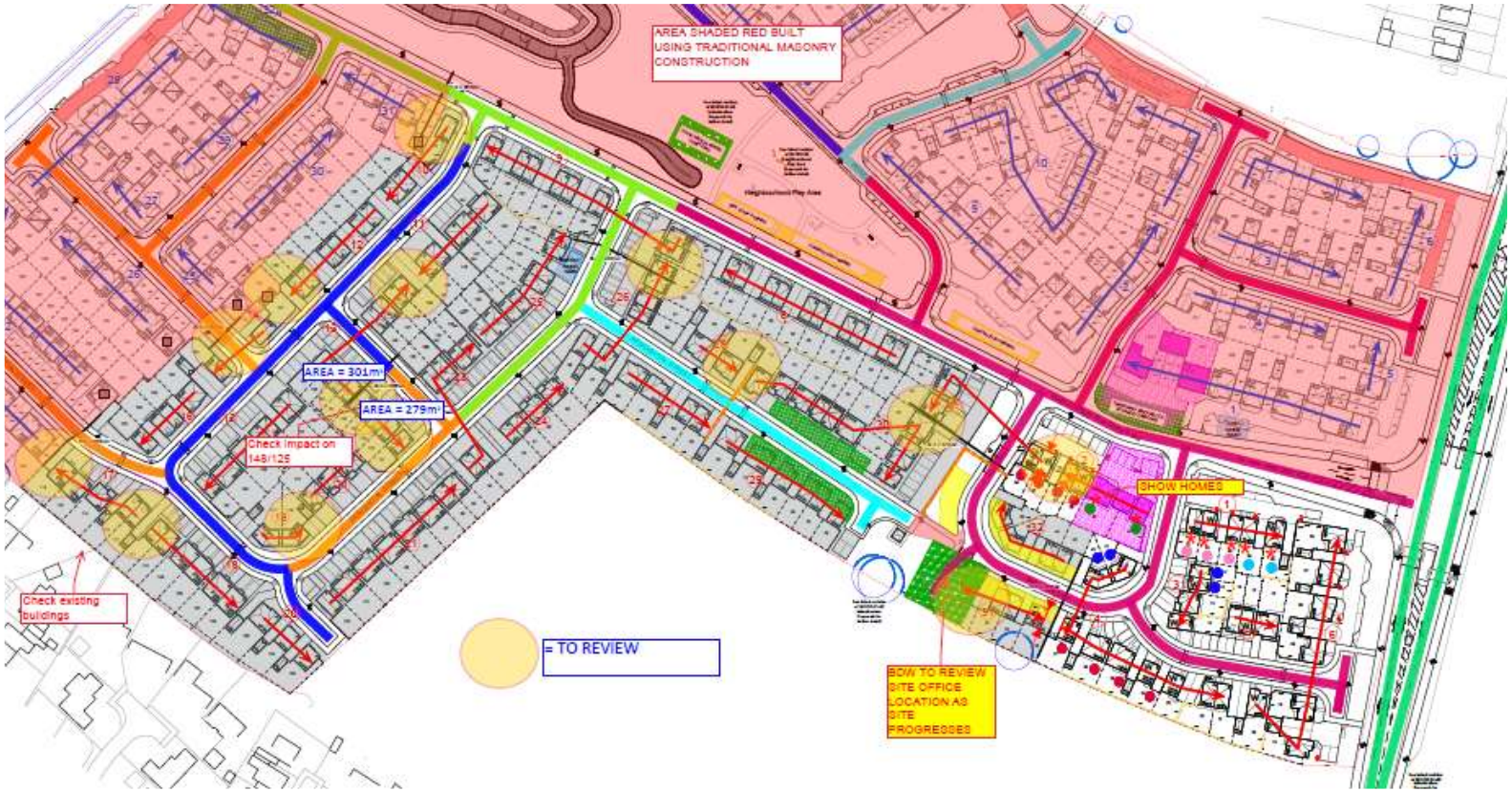
- Desktop review of site location
- Check offsite buildings
- Highlight buildings not shown on execution plan

Example Desktop Review

Example Offsite Fire Risk Assessment

Initial Review

- Clarify other sites/phases which are out of scope.
- Follow build route.
- Highlight key areas for further detailed review.
- Review building sizes, cross referencing design information.
- Consider pre-agreed assumptions



Example Initial Review

Example Offsite Fire Risk Assessment

Example concepts

Figure 1:
Plot 1, plot 2 and plot 3 are currently unclad and unlined, meaning the timber frames are exposed as the masonry and plasterboard are not complete and scaffolding is still up.

Plot 1, plot 2 and plot 3 are fire risks to the existing off site houses (O1, O2 and O3) whilst at this stage.

Plot 1, plot 2 and plot 3 would need to have been assessed and any resultant fire mitigation added.

Extract from STA PP5 Table A

No. of Storeys	Emitter length (eL)											
	4m	5m	6m	7m	8m	9m	10m	11m	12m	14m	16m	20m
1	3.0	3.0	3.0	3.1	3.3	3.4	3.4	3.5	3.5	3.6	3.7	3.8
2	3.4	3.9	4.3	4.7	5.0	5.2	5.5	5.7	5.9	6.2	6.7	6.8
3	4.5	4.5	5.0	5.5	6.0	6.4	6.8	7.1				

Example Offsite Fire Risk Assessment

Example concepts

Figure 2:
As construction progresses, plot 1, plot 2 and plot 3 are now masonry and plasterboard complete, and the scaffolding has come down. They are no longer a fire risk to the existing houses (O1, O2 and O3).

Example Offsite Fire Risk Assessment

Example concepts

Figure 3a:
Plot 1 and plot 2 have legally completed and/or occupied. They are no longer in developer control and have become ‘off site’.

Plot 4 would be too close to plot 3 and would present a fire risk. Therefore, in this example, the developer could retain ownership of plot 3 (buffer plot) to ensure it isn't occupied until plot 4 has masonry up and plasterboard complete.
Alternatively in-built fire mitigation could have been added to plot 4.

Example Offsite Fire Risk Assessment

Example concepts

Figure 3b:
If plot 3 also legally completed and/or was occupied, it would also be classed as 'off site' similar to plot 1 and plot 2.

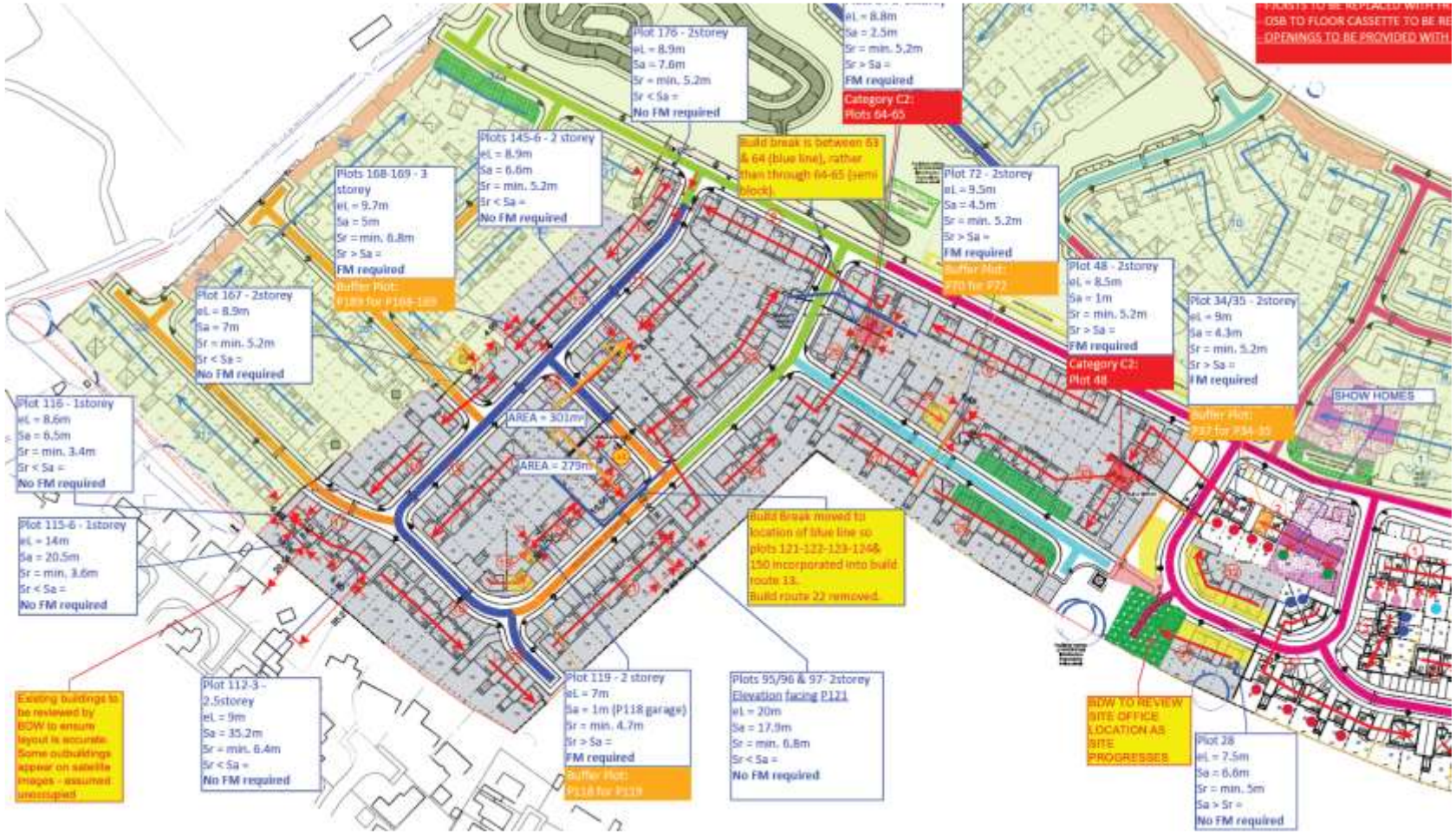
This would mean the site boundary line would shift to between plot 3 and plot 4 and additional fire mitigation may be required for plot 4.

Buffer plots can be a cost effective way to address fire mitigation but needs to be planned well in advance.

Example Offsite Fire Risk Assessment

Detailed Assessment

- All highlighted points reviewed
- Emitter lengths, separating distances etc. noted where required.
- Additional FM specified where required.
- Standard solutions for each category
- Assessment of planned build route and identified nearby buildings.



Example FM Assessment

Offsite Fire Risk Assessment

Review

Prior to first frame delivery:

- Offsite Fire Risk Assessment (OSFRA) issued to Division.
- Division to ensure OSFRA accurate including on site conditions, planned sequence, current offsite buildings.
- Site registered with STA Site Safe.

Ongoing:

- *Does the OSFRA accurately reflect current site and nearby conditions?*
  - Review by Divisional site team at intervals not exceeding 3 months, or if there are significant changes.
  - Regular reviews completed by Divisional Safety Manager.
- Ensure updated assessment is developed should conditions change.

Common Myths	Clarification
The building will meet the Building Regulations so no further measures are needed.	‘During construction’ and ‘in use’ requirements differ, both must be fully considered.
On multi unit sites the site boundary is fixed.	As plots are occupied/legally completed the boundary changes, with these buildings becoming off site.
I’ve an offsite fire risk assessment so there is no fire risk.	Following the guidance will not stop a fire occurring, but ensure consider the effect of a fire within the timber frame, on the properties outside the site boundary. On site buildings to be included in the on site fire risk assessment. Preventing a fire starting through good site practices should be the on site priority.
Once complete the assessment can be filed and forgotten about.	These documents must be followed. They should also be regularly reviewed and updated if required.

Common Myths

This is solely a timber frame supplier issue.

Clarification

Remember responsibility for ensuring the risk is assessed remains with the Principal Designer/Principal Contractor, who control the majority of the site variables.

The timber frame supplier is best placed to complete the assessment.

Whilst this this a popular view with Principal Contractors, the timber frame supplier has little control or oversight of key decisions. The PC is:

- In control of the site
- Responsible for calling off frames
- Responsible for occupying plots
- Based on site to observe changes nearby
- In control of the overall build of each plot
- In control of site planning & changes required to build routes.
- Responsible for ensuring SHE Standards are followed.

‘Golden Rules’ Overview

Key takeaways

• **GUIDANCE**	Most timber frame suppliers can only provide fire mitigation guidance based on: • Structural Timber Association Guidance. • The detailed site execution plan and information provided. • Some will require assessments from competent external fire engineers.
• **ASSUMPTIONS**	Generally a continuous build programme and no ‘ad-hoc’ occupations is assumed.
• **RESPONSIBILITY**	Compliance is the responsibility of the Principal Designer / Principal Contractor Care should be taken to review the assessment and consider the sequencing of the build to ensure the safe handover of the houses is fully addressed.
• **REVIEW**	Developer’s Site Team are to complete regular on site assessment to ensure the FM assessment accurately reflects current on and nearby off site conditions. • If conditions change please notify timber frame supplier/fire engineer with an updated execution plan.
• **BUFFER PLOTS**	Buffer/stand off plots **cannot** be legally completed or occupied until adjacent plots have masonry and plasterboard installed. If this isn’t achievable FM is required to the emitter plot.
• **CONSIDER**	Show homes, sales centres and site offices are need to be considered through on site fire risk assessments

‘Golden Rules’ Specifics

Key takeaways

• **BUILD BREAKS**	Consider location of breaks in build by selecting natural breaks between plots (e.g. where a topographical feature or lengths of gardens separate plots).
• **SEQUENCE**	Consider resequencing the build to avoid new timber frame being built adjacent to occupied buildings. This could be as simple as a different build order or using a buffer plot as a break.
• **ADJACENT SITES**	If building next to another developer’s site consider building units close to the boundary first to avoid the requirement for mitigation.
• **RULES OF THUMB (FROM STA GUIDANCE)**	• Detached houses (max 3 storey/11m elevation) require min 7.1m separation. • Large runs of houses 1m apart may need vertical separation. • Larger 2 storey / 3 storey terraces require min separation of: ▪ 10.5m / 13m with max. 10m elevation facing occupied building. ▪ 12.75m / 16m with max. 15m elevation facing occupied building. ▪ 14.25m / 18m with max. 20m elevation facing occupied building. • Apartments to be assessed.
• **FIRE ENGINEERS**	• Large/complex projects require a fire engineer. • Projects next to high risk buildings require a fire engineer. • A fire engineer may be able to offer a value engineered solution.
• **ESCAPE ROUTES**	• Occupied buildings require an escape route outside of the separating distance (generally double).

Thank you

Any questions?