Appendix E-1: Fire Plan

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MEMORANDUM

To: Jakki Tonkovich, Manager, Nutmeg Homes Project

From: Michael Huff, Dudek Principal Fire Protection Planner

Subject: Nutmeg Fire Protection Plan
Date: July 17, 2019
Attachment (s): Figures 2, 4, and 5 of Conceptual Fuel Modification Plan (Revised July 2019)

Item 1. Applicant has requested Dudek to evaluate wrapping a perimeter fire wall (e.g., extension of proposed sound wall) around the length of the southern portion of the Nutmeg Homes site in lieu of off-site fuel modification zone (FMZ) onto CALTRANS ROW. Applicant met with CALTRANS, who expressed their concern with allowing a private entity clearing vegetation within their ROW. Dudek has determined that the installation of an 8-foot high solid block wall would provide adequate protection (e.g. fire barrier) from surface fires off the Interstate 15 freeway. The heat-deflection wall would, therefore, eliminate the need for Applicant to access CALTRANS ROW for off-site vegetation clearance. Additionally, this wall would not affect firefighter access to the rear of all structures, since site plan already illustrates a pathway around the buildings. The FMZ change does not impact the analysis or results of the Nutmeg Homes Fire Protection Plan (FPP) dated May 2019. To that end, FPP Figure 5 and text addressing fire protection measures for west and south sides of southern parcel have been revised to reflect the change in FMZ configurations and are attached for review.

Item 2. Fire Protection Plan. Portions of Executive Summary; Section 1.2.3, Section 6.5.3; Sections 6.8.1.1 and 6.8.1.2 (4); Table 5, and Section 7.1 of Nutmeg Homes FPP (prepared by Dudek dated May 2019) are revised as detailed below (see underlined FPP text edits). Figures 2 and 4 have been updated to reflect minor site plan adjustments since preparation of FPP.

EXECUTIVE SUMMARY

The proposed development will include:

- Fuel Modification Zones and additional Fire Protection Measures for the north side of northern parcel and west and south sides of southern parcel with firefighter access around buildings

1.2.3 Project Description

The Nutmeg Homes Project proposes to construct 135 units, instead of 137 units, on 7.7 acres or at a density of 17.5 dwelling units per acre.

6.5 Fire Protection Systems

6.5.3 Automatic Fire Sprinkler Systems

Automatic fire sprinkler systems for structures adjacent to fire walls in southern parcel will be upgraded to a NFPA 13 system in accordance with EFD and NFPA Standards.

6.8 Defensible Space and Vegetation Management

6.8.1.1 Escondido Fuel Modification Zone Standards

The purpose of this section is to document EFD's standards and make them available for reference. However, the Project is proposing a site-specific fuel modification zone program with additional measures that are consistent with the intent of the standards, since the project site is constrained on the northern edge, providing 12 to 68 feet, and the western and southern edges of the southern parcel, providing 13 to 15 feet, of achievable fuel modification. As such, the Nutmeg Homes site will include mitigation measures for additional fire prevention, protection, and suppression in compensation for the reduced FMZs on the north, west, and south sides of the property.

6.8.1.2 Specific Nutmeg Homes Fuel Modification Zones

4. The FMZs proposed for portions of this project are not standard EFD widths as some areas include reduced Zone 1 and/or Zone 2 areas and are less than 100 total feet within the property borders. These reductions are related to grading extents or property boundaries that restrict Zone 1 and 2. Figure 5 illustrates the FMZ extents and Table 5 summarizes the breakdown for FMZs on the periphery of the site. The adequacy of the provided FMZ widths is based on a variety of analysis criteria including predicted flame length, fire intensity (BTUs) and duration, site topography, extreme weather, position of structures on the property, position of roadways, adjacent fuels, type of construction, and additional fire protection measures that focus on functional equivalency as a 100-foot wide FMZ.

Table 5
Nutmeg Homes Fuel Modification Zone Summary

Area	Fuel Modification Distance	Comments
Northern Edge	Zone 1 = 12 to 68 feet on-site and Zone 2 = 0 to 107 feet on-site	On-site FMZ Zone 1 is irrigated and would be maintained by HOA. Available on-site FMZ Zone 2 includes a triangular portion of the property in the northwest corner. Residential homes would receive additional fire protection measures as addressed in Section 7.1.
Eastern Edge	77 to 100-foot wide; Zone 1 occurs within property	Zone 1 consist of irrigated landscaping maintained by HOA combined with paved road and ROW (North Center City Parkway).
Southern Edge	Zone 1 = minimum 15 feet in width	Minimum 15+ feet of HOA-maintained landscaping on the site. Residential homes would receive additional fire protection measures as addressed in Section 7.1.
Western Edge	Zone 1 = minimum 13 in width	On-site FMZ Zone 1 is irrigated and would be maintained by HOA. Residential homes would receive additional fire protection measures as addressed in Section 7.1.

5. Combustible construction, including patio covers, trellises, and cabanas, shall not be allowed in the rear yards of structures adjacent to perimeter fire walls.

6. All exterior fireplaces and fire pits shall be gas-fired (e.g., no wood burning).

7 Additional Edge mitigation

As indicated in this report, the FMZs and additional fire protection measures proposed for the north, west, and south sides of the development provide equivalent wildfire buffer, but are not standard zones.

7.1 Additional Structure Protection Measures for North, West, and South Sides of Development

The following additional measures will be implemented to "mitigate" potential structure fire exposure related to the provided FMZs for the north, west, and south sides of the development.

2. A noncombustible, 8-foot wall at the rear or side yard, as applicable, to function as a heat-deflecting wall;

Justification. Heat-deflecting walls of masonry construction would augment the available FMZs. The masonry block walls provide a vertical, non-combustible barrier between the line of heat, fumes, and flame and the Nutmeg structures. Once these fire byproducts intersect the wall, they are deflected upward or, in the case where lighter fuels are encountered, they are quickly consumed, heat and flame are absorbed or deflected by the wall, and the fuels burn peaks out within a short (30 second–2 minute) time frame (Quarles and Beall 2002). Walls like these have proven to deflect heat and airborne embers on numerous wildfires in San Diego, Orange, Los Angeles, Ventura, and Santa Barbara Counties. These walls are consistent with NFPA 1144 Standard for Reducing Structure Ignition Hazards from Wildland Fire – 2008 Edition, Section 5.1.3.3 and A.5.1.3.3 and International Urban Wildland Interface Code (ICC 2012). NFPA 1144, A.5.1.3.3 states: "Noncombustible walls and barriers are effective for deflecting radiant heat and windblown embers from structures."

11 REFERENCES

Quarles, S.L., and F.C. Beall. 2002. Testing Protocols and Fire Tests in Support of the Performance-Based Codes. In "Proceedings of the California 2001 Wildfire Conference: 10 Years after the 1991 East Bay Hills Fire." October 10–12, 2001, Oakland, California. University of California, Forest Products Laboratory, Richmond, California, Technical Report 35.01.462, pp. 64–73.

Please feel free to contact me at (619) 992-9161, if you have any questions or require any additional information.

Attachment 1

Figures 2, 4, and 5
(Revised - July 2019)

SOURCE: AERIAL- SANGIS IMAGERY 2017; DEVELOPMENT PLAN - EXCEL ENGINEERING 2019

DUDEK

N

0 75 150 Feet

FIGURE 2

Project Site Plan

Fire Protection Plan for the Nutmeg Homes Project

INPUTS

BehavePlus Fire Behavior Modeling Inputs

Variable	50th Percentile (Onshore flow)	97th Percentile (Offshore/Santa Ana condition)
1h Moisture	3%	2%
10h Moisture	5%	3%
100h Moisture	7%	5%
Live Herbaceous Moisture	60%	30%
Live Woody Moisture	90%	50%
20-foot Wind Speed	10-20 mph	30-40 mph (50 mph gusts)
Slope Steepness	3% to 35% manufactured slopes = 50%	3% to 35% manufactured slopes = 50%
Wind Adjustment Factor	0.6	0.6

RESULTS

Nutmeg Homes BehavePlus Fire Behavior Model Results
Existing Conditions

Fire Scenarios	Flame Length (feet)	Fireline Intensity (BTU/feet/second)	Spread Rate (mph)	Spotting Distance (miles)
Scenario 1: Coastal sage scrub, 35% slope, 40 mph sustained winds				
Fuel Model Sh5	49.3	27,196	9.0	2.2
Scenario 2: Coastal sage scrub, 25% slope, 40 mph sustained winds				
Fuel Model Sh5	49.1	26,870	9.0	2.2
Scenario 3: Caltrans ROW and natural 27% slope, 20 mph sustained winds				
Caltrans ROW (Gr1)	2.3	35	0.3	0.2
Coastal sage scrub vegetated slope	24.0	5,673	2.2	0.9
Scenario 4: Coastal sage scrub, 27% downhill slope, 20 mph sustained winds				
Coastal sage scrub vegetated slope	24.6	6,014	2.3	0.9

Nutmeg Homes BehavePlus Fire Behavior Model Results
Post-Project Conditions

Scenario	Flame Length (feet)	Fireline Intensity (BTU/feet/second)	Spread Rate (mph)	Spotting Distance (miles)
Scenario 1: Fuel treatments on south-facing natural and manufactured slopes, 40 mph maximum winds				
Fuel modification zone 1 (FM8)	2.6	46	0.13	0.3
Fuel modification zone 2 (Sh1)	10.6	964	1.5	0.8
Scenario 2: Fuel treatments on flat, landscaped area, 40 mph maximum winds				
Fuel modification zone 1 (FM8)	2.6	46	0.13	0.3
Scenario 3: Fuel treatment on natural 27% slope, 20 mph maximum winds				
Fuel Modification zone 2 (Sh1)	0.9	4	0.03	0.1
Scenario 4: Fuel treatments on east-facing, downhill slope, 27% slope, 20 mph maximum winds				
Fuel Modification zone 2 (Sh1)	0.9	4	0.03	0.1

Scenario Run #1
Scenario Run #2
Scenario Run #3
Scenario Run #4
N Nutmeg St
N Centre City Pkwy
Cheyne Rd
Coyote Hill Glen
Rockhoff Rd
Wildflower Pl
ProjectBndy
bing

SOURCE: AERIAL-BING MAPPING SERVICE 2017; DEVELOPMENT PLAN - EXCEL ENGINEERING 2019

DUDEK 0 300 600 Feet

FIGURE 4
BehavePlus Fire Behavior Analysis Map
Fire Protection Plan for the Nutmeg Homes Project

- 8-Ft High Fire Wall
- Retaining Wall
- Project Site

Fuel Modification Zones

- Zone 1 - Irrigated
- Zone 2 - 50% thinning (Onsite)
- Water Quality Basin
- Interior Landscaping
- Building
- Roadway/Hardscape
- Gated Emergency Vehicle Access

SOURCE: AERIAL: SANGIS IMAGERY 2017; DEVELOPMENT PLAN: EXCEL ENGINEERING 2019

DUDEK

0 60 120 Feet

FIGURE 5

Conceptual Fuel Modification Plan

Fire Protection Plan for the Nutmeg Homes Project