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Rio Lobo Investments December 19, 2017

Wildfire Mitigation and Forest Health Plan

Section 1: Introduction

This Wildfire Mitigation and Forest Health Plan was requested by Rio Lobo Investments, LLC in support of a land use planning initiative. This document is intended to address forest health issues and needed actions to increase resiliency to high intensity wildfire within the area included the land-use proposal. The parcel is described as Tax Lot 1711000006000 in portions of sections 26 and 35.

Based on Congressional direction, the federal land management/fire services were directed to address the expanding wildland fire situation at the national level. The *Cohesive Wildland Fire Strategy* came out of that effort.

The three focal points of the *Western Cohesive Wildland Fire Strategy* are:

- Restore and maintain resilient landscapes
- Create Fire Adapted Communities
- Provide for safe and effective wildfire response

This analysis and associated recommendations are intended illustrate how this proposed project will comply with and contribute to development of a fire-adapted community on Bend's west side and provide for an effective and safe environment for fire service response.

Section 2: Historical Use/Recent Fire Events/Current Condition

This parcel is bordered by Tumalo Creek and Shevlin Park to the west, the Urban Growth Boundary to the northwest, to the north and east with residential development of varying densities within the city limits, and the Tree Farm development to the south. Over the last two years vegetation management

activities to reduce highly flammable brush fields on portions of the parcel have been completed.

In August, 1990 the Awbrey-Hall Fire started in Shevlin Park along Tumalo Creek. During the early stages of the incident the fire quickly spread east up out of the creek bottom and spotted northeast across Shevlin Park Road. It spread up the hill and then turned south onto the Rio Lobo property and other adjoining parcels. Some twelve hours later, the fire spread was stopped in Deschutes River Woods after jumping the Deschutes River. Over the last 25 years the portion of the parcel owned by Rio Lobo within the footprint of the fire has become dominated by a dense stand of highly flammable bitterbrush, sagebrush and rabbit brush with little if any pine natural regeneration.

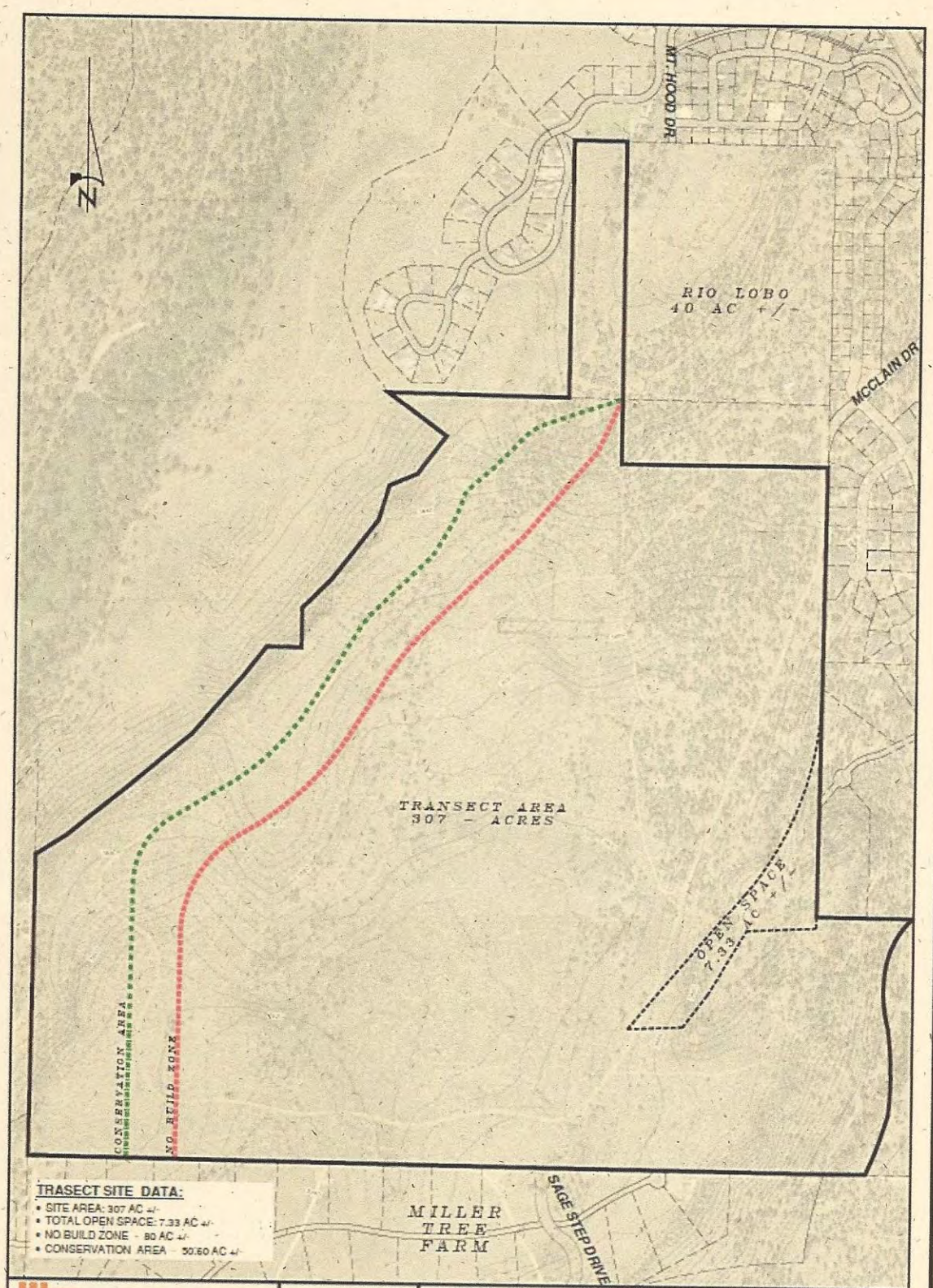
Current Forest Vegetation Condition

As discussed above, a significant portion of the brush field on the parcel has been mowed as a wildfire mitigation treatment. A portion southeast, parallel to, and adjoining the slope above Tumalo Creek and Shevlin Park remains untreated as well as a rocky portion near the middle of the parcel.

Additionally, a portion of the parcel to the east of the brush field area was not impacted by the fire and supports a modest stand of second growth Ponderosa pine, pockets of brush and some Ponderosa seedlings from natural regeneration. This area has been non-commercially thinned to optimize forest health. During the fire, flanking control lines were constructed that successfully kept the fire spread out of this area.

Fire fuels mitigation efforts within this unburned area should focus on mitigating the ladder fuel situation by pruning lower branches on trees and removing brush from under the tree canopies. This action will reduce the potential for tree crown fire in the event of any subsequent fire ignitions.

The Becon Engineering graphic on the following page shows the proposed project layout, topography and surrounding areas of development. The "No Build Zone" and "Conservation Area" designations to address wildlife mitigation issues are also shown adjacent to Shelvin Park along the west boundary of the project area.



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FOR:
KEVIN
SPENCER

RIO LOBO - TRANSECT AREA
PRELIMINARY SITE LAYOUT
DESCHUTES COUNTY, OREGON

SHEET 1 OF 1

PRELIMINARY

DATE: 12/18/2017 | SCALE: 1" = 400' | DRAWN BY: JLB | PROJ: 13861

Wildlife Considerations

Geographically, this parcel falls between Shevlin Park to the west and areas of high density residential development to the east. As proposed, the development plan includes two parallel strips of ground adjacent to Shevlin Park as part of a transition from wildland vegetation conditions to residential development. As described in the *Wildlife Habitat Management Plan* from Mason, Bruce & Girard, Inc., the developers have proposed this approach as a wildlife mitigation action that primarily focuses on the brush fields that provide hiding cover for ungulates transiting this area as well as a variety of smaller wildlife.

Section 3: Wildfire Mitigation Components

Fire Behavior-Wildfire, particularly in central Oregon, generally spreads from progressive linear fire movement over the ground with direct flame contact, and/or from spotting as a result of firebrands carried aloft with the fire convection column, then carried downwind and landing on a susceptible fuel source.

The *Fire Triangle* is composed of fuel, oxygen and heat. The *Fire Behavior Triangle* is composed fuels, topography and weather. These two models help illustrate what is required to support fire behavior. Likewise they offer insight to potential mitigations. Clearly there is little that can be done with the oxygen and weather variables.

The fuels variable however is common to both and is susceptible to mitigation by reducing the amount and continuity of *available* flammable material. *Availability* in this case does not always mean removal. "Ladder fuel" treatments such as pruning lower branches off of trees and removing brush under tree canopies is one such example. Taking this action tends to isolate and make tree crowns less available to support crown fire development. Landscaping with deciduous trees is another example due their lack of resinous needles.

Reducing the amount of available flammable fuels reduces fire intensity and consequently produces less heat. This in turn lowers spot fire risk by minimizing production of firebrands available to produce downwind ignitions.

The end objective is to keep the fire on the ground where driveways, streets, green lawns, etc. are effective in reducing fire intensity and rates of spread, and where fire response resources can safely and effectively work to suppress the fire.

Topography is the other big variable. While it can't be changed, it can be avoided. In addition to increasing rates of fire spread, slopes have an impact on winds. Drainages with significant canyons such as Tumalo Creek typically can vector wind patterns away from prevailing free-air wind flow. Side drainages and draws coming off of these more dissected canyons should be expected to funnel and accelerate winds. Likewise accelerated rates of fire spread from canyon-bottom ignitions should be expected. Wind patterns will be more turbulent where side draws emerge from the drainages. Consequently structures should be located well-way from the mouth at the top of side drainages and well set back from rim-rock edge and/or above steep slopes above drainages and canyon walls.

Defensible Space- Defensible space around buildings and vegetation maintenance along driveways and access/egress routes is a critical component to wildfire effects mitigation as discussed above. The "zone concept" around buildings implements a "defense in depth" approach with progressively more modest treatment standards as the distance from structures increases.

Different jurisdictional agencies have slightly different defensible space standards, but all with the same intent. The defensible space standards identified in NFPA 1144 meet or exceed the defensible space requirements of the Oregon Department of Forestry-administered "SB360" (*The Oregon Forestland-Urban Interface Fire Protection Act of 1997,* ORS 477.001-477.061) and the Deschutes County defensible space standard for residential development in F-1 and F-2 (DCC 18.36.070 and DCC 18.40.070) zones.

Recommended Vegetation Management Standards for Structural Defensible Space

Zone 1: 30 Feet Adjacent to Structures

Use non-flammable landscaping materials within first 5 feet of structures. All vegetation and combustibles are removed from under decks and within 5 feet of the home or auxiliary structures. Outside of 5 feet, low-growing, resin-free, fire resistive plants are carefully spaced and maintained, and are kept free of dead material that do not allow flame lengths greater than 3 feet. Areas of lawn must be well irrigated and regularly mowed. Mature trees are pruned to a height of 6 to 10 feet from the ground with no brush inside of the tree dripline. Juvenile trees are not pruned more than 20% of stem length. Trees may not touch the home. No firewood storage is permitted outside of an enclosed structure. This zone includes driveway/road surfaces.

Zone 2: 30 to 100 Feet from Structures

Plants are low-growing and well irrigated. Tree canopies are spaced at 15-20 feet, or 30 feet between small groups of small trees. Zone 2 treatments will extend to the lot boundary (beyond the 100-foot zone) when the lot is adjacent to down-hill slopes greater than 20%. Small individual brush species will be irrigated, maintained free of dead material and outside the dripline of trees.

Zone 3: 100 to 200 Feet from Structures

Trees will be thinned and pruned, woody debris removed and brush fields mowed or removed. Density of taller trees will be reduced and maintained so that canopies do not touch. Taller, more mature trees however typically present less of a fire risk as long as brush is not present within the tree drip-line and lower limbs are pruned.

Over time, tree canopies will grow together gradually. A long-term strategy is required to address this issue. Provisions should be made within CC&Rs for removal of some large trees as needed *if this standard is to be maintained.*

Zone 2 and 3 treatment areas will overlap each other between home sites and extend into open areas. For lots with greater than 20% slopes, Zone 2 treatments will extend beyond 100 feet to the lot boundary.

Beyond the 200-foot Zone 3 boundaries associated with the building lots, the open space will continue to be maintained consistent with the Zone 3 wildlife standards.

Maintenance of Forest Health and Landscape Resiliency

Ongoing vegetation management is the key to maintenance of a healthy forest and overall resilience to the effects of fire. Young pine seedlings and brush will become established through natural regeneration. A coordinated, long term plan will be needed to help plan for and evaluate options for vegetation regrowth and sprouting. Depending on location and condition of older forest vegetation, young seedlings may be used to provide additional wildlife screening or other aesthetic mitigations. Alternatively, depending on spacing, intermingled vegetation and continuity, young pine reproduction can quickly compromise desired conditions within the defensible space zones.

Antelope bitterbrush and other brush species generally require an ongoing action plan to enhance winter range value for deer and to maintain compliance with established defensible space standards.

Bitterbrush, for example, is often classified by its growth (seral) stage. Typically the majority of the plants within an area will fall into one of three categories. The most common treatment is mowing or other mechanical means. A treatment priority model is shown below.

Antelope Bitterbrush Site Condition Classification

Priority 1: Decadent, over mature stands with a high component of dead wood. ("Late Seral")

Bitterbrush in this class is mature to the point of decadence, with long, non-leaf bearing stems. On good sites it is up to five feet tall. It is composed of relatively large woody stems and branches with the leaf bearing branches isolated at the ends of bare stems. Current year's growth is short, 1" or less, infrequent and is not readily apparent. When the bitterbrush plants in this class reach 70% or more of the plants in an area, consideration should be given to renewal at the

first opportunity by mowing or other means. Bitterbrush in this class are of relatively less deer winter range value.

Mowing to approximately a 6" height will allow a percentage of the plants to re-sprout and reset the seral stage.

Priority 2: Mixed-age stands or stands dominated by young mature plants. ("Mid-seral")

Bitterbrush in this class is mature, but the majority of the plant is still leaf-bearing. On good sites these plants are two feet to three feet tall. Most of the main stems, though relatively large, have leaf-bearing branches to within one foot of the ground. Most leaf-bearing branches show at least some current year's growth. Plants in this category are important for deer winter range in part because they typically extend above winter snow levels and are available as browse.

Priority 3: Young, developing stands. ("Early seral")

This is young, thrifty bitterbrush. These plants are up to two feet in height and the stems have leaf-bearing branches from the ground to the top of the plant. Current year's growth is up to six inches and is present over most of the plant.

Vegetation Management in Wildlife Habitat Areas

Once defensible space around structures and along egress routes is defined and identified on the ground, less aggressive fuels management options can be utilized to enhance the visual screening effect of natural topographic features and to benefit wildlife. Vegetation associated with rock outcrops, lava ridges and other topographic features can often be left untreated as long as doing so will not compromise the defensible space standards of nearby structures and egress routes. *Making the choice to defer treatment must be made with the understanding that if a fire ignition occurs in such an area that it will most likely be totally consumed; that it will burn with high intensity and that it will potentially generate a significant number of firebrands to start spot fires.* Deferred treatment areas should be spatially isolated from one another to enhance horizontal separation. However they can often be situated in such a manner to

appear continuous from a distance, for example from a nearby road with significant levels of traffic use.

In addition to visual screening for ungulates, rocky outcrops with heavier ground vegetation can provide habitat hot spots for a variety of smaller species.

Vegetation Management Adjacent to No Build Zone and Conservation Area

Vegetation management on the lots on the western flank of the parcel present a unique situation. As discussed in the "Fire Behavior" portion of Section 3 (page 4), fire typically spreads by two methods: linear progression and via spotting. The brush fields and other fuels adjacent to Tumalo Creek provide the potential for high intensity spread from both types of spread. Residences in this strip, in addition to being upslope from the untreated fuels area, are also downwind compounding the potential for more severe fire behavior.

The Recommend Vegetation Management Standards for Zone 2 (30 to 100 feet from structures-see page 6) specifies that Zone 2 standards will be extended to the lot boundaries when located on a greater than 20% slope. If applied, that standard could extend all the way though the "No Build Zone" to the "Conservation Area". That situation may be present on at least some of the lots on the western edge of the proposed development area.

Brush in these areas should be thinned so that if small groups (not to exceed six feet diameter) of brush are retained they must be separated by at least three times the diameter of the brush clump. They can be offset so that they provide more visual cover from a distant vantage point.

Management of brush in this manner adjacent to the "Conservation Area" will have minimal adverse impact on wildlife and provide a visual, as well as vegetative transition from wildland to residential development.

Additional mitigation measures should be considered such as installing a sprinkler system through this zone. Such an installation would reduce rates of fire spread via both of the spread methods discussed above.

A similar brush management regime should be considered in other areas of the development where the backs of lots on adjacent parallel streets abut one

another. If left totally untreated as "open spaces" they may provide readily available fuel beds for long range spotting.

Section 4: Structural Design and Materials Selection

While defensible space is a critical component to a fire-adapted community, building design and material choices can have a major multiplier effect.

Fire brands and embers from a developing fire are lifted by the convection column created by the fire and then carried downwind by the prevailing winds. When these "ember showers" encounter another building they behave much the same as snowflakes do in the winter in that many will eddy around the building, accumulating in any nooks and crevices on the downwind side of the building. These accumulations will tend to concentrate heat. To the degree that there is no contact with flammable materials (structural materials or landscaping) where these accumulations occur or that the concentrations can be avoided, the vulnerability of the structure to secondary ignition is greatly reduced.

Ground level wooden decks-Wooden decks are problematic because they provide a flat flammable surface to catch fire brands. Ground level open-sided wooden decks also provide a place for wind-blown grass, brush and other flammable debris, and fire brands to accumulate. In addition they are very difficult to clean out due the confined space. As a rule, if a homeowner can't get under the deck to clean out accumulated materials each spring before fire season, then the deck should be screened with 1/8 inch mesh screen to exclude both debris and fire brands.

A far better solution to provide ground level outdoor living space is to utilize pavers, flagstone, or some other non-flammable material.

Structural Roofing Material – Fire-resistant roofing material has become the standard in new construction and is the single most important component to fire safety.

In addition, annual roof and gutter maintenance and cleaning is critical. Needle build-up is a common occurrence. If fire brands land on the roof or accumulate in

the gutters littered with dry pine needles, much of the benefit of fire-resistant roofing is lost. In addition if an ignition is sustained in a gutter, it may provide a path for fire spread up under the fire resistant roof resulting in an attic fire.

An annual "spring clean-up" event should place emphasis on roof and gutter cleaning and should be addressed as an HOA/CC&R requirement. The *Firewise Community* framework can help institutionalize this process.

Section 5: Operational Issues and Standards

As has been identified with other WUI development areas, it is important to plan for potentially threatening wildfire events. Detailed planning with identified expected resident actions in the event of a fire-related evacuation is of the highest priority.

Evacuation Routes-Multiple egress/access routes for the development area should be planned. Avoid long cul-de-sac situations and plan for loop layout of neighborhood streets. Opportunities for emergency access gates to adjoining developments or streets should be identified and built into the transportation plan. Access/egress routes should be planned to avoid traffic bottlenecks such as narrow gates or other factors that would constrict traffic flow. Plan for dual, simultaneous use for evacuation and emergency responder access.

Communication and Information Plan for Residents-Evacuation plan maps and procedures are a critical part of pre-incident planning. Clear, concise Emergency Action Plan instructions should be present in each residence. These types of high anxiety events require clear and usable tools such as a "grab and go" checklist and evacuation route map for residents and visitors.

Section 6: Summary

Bend's west side has experienced large scale change over the last 35 years. Ground that was once characterized by commercial pine forests with a variety of wildlife uses has, in reality, become part of the city.

The 1990 Awbrey Hall fire left a half to three quarter mile strip running north to south from Shevlin Park to Deschutes River Woods. After 25 years, very little if any natural pine regeneration has occurred within the brush-dominated fire footprint. These extensive brush fields, if left un-treated, represent a very

significant fire risk to the surrounding areas of residential development and recreational use. Further, due to prevailing wind patterns, they also pose a very substantial risk to adjoining areas of residential development further to the east on Bend's west side.

The proposed development of this remnant area of the fire footprint would bring (1) fire fuels mitigation in perpetuity, (2) improved access for emergency responders, and (3) a dependable water supply system making the area a part of the solution to the city's fire risk equation. It would represent a step forward toward developing a *fire-adapted community* on Bend's west side and would *result in a net overall fire-safety benefit*.