APPENDIX J1

Off-site Mitigation Area Mitigation Plan – Burn Plan – Off-Site

Appendix J1

CORAL REEF COMMONS

University of Miami Richmond Campus

Prescribed Burn Plan

October 9, 2017

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1.0 INTRODUCTION

The Conservation Program for the Coral Reef Commons (CRC) Habitat Conservation Plan (HCP) includes 50.96 acres of off-site mitigation (the "Off-site Mitigation Area") at the University of Miami (UM) Richmond Campus. As background, approximately fifty-five acres of the pine rockland habitat within the UM Richmond Campus was previously protected through a recorded deed restriction and includes Parcel A (50.96 acres) and Parcel B (4.49 acres). Parcel A is the Off-site Mitigation Area. The deed restriction required a "Conservation Management Plan" for the UM Richmond Campus Parcels A and B to preserve the federally endangered deltoid spurge and is contingent upon the continued listing of the deltoid spurge.

The main goal of the existing UM Richmond Campus Conservation Management Plan is to control invasive plant species. Based on the "Year Thirteen Management Report" prepared by Biscayne Environmental, Inc. (see **Appendix K**), invasive plant species are being managed within the Off-site Mitigation Area. The current Conservation Management Plan also states "Prescribed burning may be required every 3 to 5 years". However, burning is not mandated and is not occurring at the recommended frequency to maintain pine rocklands in a condition beneficial to the Covered Species in the CRC HCP.

Prescribed burning is a component of the Off-site Mitigation Area Mitigation Plan. The Prescribed Burn Plan for the University of Miami Richmond Campus ("UM Richmond Burn Plan") will be implemented on 45.60 acres of Parcel A. The objective of the UM Richmond Burn Plan is to implement prescribed burning in a manner and frequency to enhance the habitat and provide substantial benefit to the Covered Species in the Coral Reef Commons HCP. The remaining 5.36 acres (Cell 9 and Portion of Cell 11) are not included in the UM Richmond Burn Plan due to constraints with existing facilities on the UM Richmond Campus. To enhance the habitat and reduce the threat of wildfire within the 5.36 acres the pine canopy will be thinned. Although not part of the Off-site Mitigation Area, field conditions may necessitate prescribed burning and/or pine canopy thinning in portions of Parcel B. The range of the burn area will be between 45.60 acres to 48.65 acres.

The other component of the Off-site Mitigation Area Mitigation Plan is to revise the existing deed restriction on Parcel A. The revised deed (or other conservation encumbrance) will allow for further protections than the current deed (See Section 7.10 of HCP for additional information).

The 50.96-acre Off-site Mitigation Area is designated as Natural Forest Community (NFC) Pine Rockland habitat by Miami-Dade County (MDC Code § 24-5). Because the UM Richmond Burn Plan includes mechanical fuel and canopy reduction within designated NFC areas, a NFC removal permit will be required by MDC.

2.0 FIRE HISTORY IN THE UNIVERSITY OF MIAMI RICHMOND CAMPUS

Parcels A and B are divided up into seven fire control cells (cells 9-15) with established fire breaks (see **Attachment 1** for fire control cells). Fire control cells 11, 13, and 15 are located entirely on Parcel A and fire control cells 9, 10, 12 and 14 overlap onto Parcel B. The last prescribed burn in the Off-site Mitigation Area was conducted in 2003 in fire control cell 15, which represents approximately one third of Parcel A. Wildfires were recorded in August 2004 in cells 9-13 and in September 2006 within cell 15.

3.0 INITIAL WORK - PRESCRIBED FIRE PREPARATION

The Off-site Mitigation Area Burn Plan will be implemented for fire control cells 10-15. As evidenced by comparing 2004 and 2016 aerial imagery, the lack of regular fire has resulted in an increase in pine canopy cover. The lack of fire also increases the probability of wildfire that can be destructive to the pineland, as well as smoke impacts and spot fire concerns, to the surrounding residences and major transportation corridors.

3.1 Mechanical Fuel Reduction

Canopy reduction (pine thinning) and understory reduction will be required prior to implementing the prescribed burn. Pines will be hand thinned where feasible but in some areas may need to be mechanically harvested. Removed trees will be hauled off site or piled for burning. All equipment utilized for mechanical fuel load/canopy reduction will be rubber-tired or rubber tracked vehicles.

Mechanical treatments for fuel load understory reduction will only involve mastication and mowing, and not include roller chopping. Because mastication and mowing can result in fuel accumulation, burning will be conducted before the chips and fine fuels dry out (O'Brien et al. 2010). Raking prior to burning will also be selectively used in certain areas to reduce hazardous fuel loads. In the event a burn does not occur immediately following the initial mastication/mowing activities, the Applicant will coordinate with MDC to determine appropriate measures for management of masticated and mowed plant material. This management may include the piling and burning of plant material outside and within the Off-site Mitigation Area to provide microhabitat for Covered Species. Any piling within the Off-site Mitigation Area will avoid listed plant species to the maximum extent practicable.

3.2 Water Availability

The UM Richmond Burn Plan will be implemented by a contracted Certified Prescribed Burn Manager ("Burn Manager") licensed by the Florida Forest Service (FFS). Water will be readily accessible to reduce fire risks to the community and facilitate quick mop-up for efficient smoke management.

3.3 Firebreak Establishment

The firebreaks within the Off-site Mitigation Area have already been established and total approximately 10,890 feet. Maintenance of the firebreaks will be required prior to implementing the Off-site Mitigation Area Burn Plan. To avoid surface impacts, blacklining, string trimmers, or hand raking/chopping will be implemented to for the firebreak maintenance. In the event the fire control cells that overlap onto Parcel B (Cells 10, 12 and 14) cannot be burned, additional firebreaks may be needed. If required, the additional firebreaks would total approximately 2,250 feet.

3.4 Covered Species Minimization Measures

A FBB roost survey will be conducted for the Off-site Mitigation Area. If a roost is identified during the pre-construction survey, the roost will be protected during management activities by hand removal of subcanopy or ladder fuels surrounding tree, raking and removal of fine fuels surrounding tree, limiting of chemical use around the tree, creating wetline around the tree, and other similar and appropriate methods for preservation of the roost, as identified in USFWS guidelines for Red Cockaded Woodpecker Cavity Tree Protection, Chapter 8k-5c and d (USFWS 2003).

3.5 Best Management Practices (BMPs)

The following BMPs will be implemented to minimize the effects of the Off-site Mitigation Area Burn Plan. BMPs for smoke management are included in Section 4.2.4.

A. The previously established fire control cells and associated firebreaks were designed to be small (approx. 2-16 acres) to promote mosaic style burning, minimize direct impact of burning on species, and assist in smoke management;

B. When feasible, hand removal for pines will be preferentially used over mechanical removal;

C. Roller-chopping will be a prohibited mechanical treatment method;

D. Debris from mechanical and hand thinning will be stacked in burn piles and/or transported off site;

E. Any equipment used for mechanical removal will utilize rubber tired vehicles, if available, otherwise the use of tracked vehicles will be selected;

F. Mechanical equipment utilized will be the minimum size and weight necessary to perform the task will be preferentially selected;

G. All equipment will be properly inspected and maintained;

H. Mechanical equipment will not be stored within the Off-site Mitigation Area;

I. Mechanical access will be through adjacent development and along firebreaks;

J. To minimize the introduction of exotic and nuisance plant species, decontamination of equipment will be conducted prior to conducting land management activities;

4.0 IMPLEMENTATION OF PRESCRIBED FIRE ON UNIVERSITY OF MIAMI RICHMOND CAMPUS

Given that many of Florida's ecosystems are fire dependent, legislation governs prescribed burning activities in MDC and the State of Florida. Both Florida Statute 590.125 and Chapter 5I-2 of the Florida Administrative Code (FAC) grant the FFS the authority to regulate prescribed burning in Florida. Florida law encourages prescribed burning. 590.125, F.S. states that (1) a certified prescribed burn manager must be present, (2) a written prescribed plan must be prepared, (3) prescribed burning should be considered in the public interest and not constitute a nuisance, (4) prescribed burning is a property right. Furthermore, it states that if burning is conducted according to the act, the owner or his agent cannot be held liable for damage by fire or smoke unless gross negligence is proven.

4.1 Objectives

Prescribed fire is the most important consideration in pine rockland management and should be administered every 3 to 7 years to maintain community structure and to prevent the community from succeeding to rockland hammock (FNAI 2010). These relatively shorter fire return intervals not only control hazardous fuel levels, they increase understory plant species diversity, and produce less smoke (O'Brien et al. 2010). Although hardwood species are a natural component of pine rocklands, without fire they tend to increase in cover and reduce the amount of light penetrating the forest floor (Wade et al. 1980) and herbaceous diversity and cover (Robertson, Jr. 1953; Wade et al. 1980).

The lack of fire within portions of the UM Richmond Campus pine rocklands has resulted in a too dense pine canopy and understory. Lack of regular fire also increases the probability of wildfire that can be destructive to the pineland, as well as smoke impacts and spot fire concerns, to the surrounding residences and major transportation corridors. Maintaining regular prescribed burning, implemented in alternate small fire control cells, will help alleviate these issues and meet burn objectives.

To ensure successful implementation of the Off-site Mitigation Area Burn Plan, previously established small fire control cells, ranging from 2-16 acres, will be utilized and community outreach and education will be conducted. For areas outside of the UM Richmond Campus, homeowner associations of residential communities within 0.5 miles will be notified of the prescribed burns prior to burning. The goal for the Off-site Mitigation Area Burn Plan is to effectively manage 45.60 to 48.65 acres of pine rocklands for listed species through the implementation of prescribed fire. While not a permit requirement, the parameters contained in the success criteria in Table 7-3 of the HCP are the goals for managing the habitat. The objectives for the prescribed fire focus on natural fire regimes for the protection and maintenance of naturally evolved biotic communities and landscapes, while providing maximum protection of life and property. The following are the objectives of the Off-site Mitigation Area Burn Plan:

- Community outreach and education
- Reduce fuel load
- Reduce risk of incendiary fires
- Ensure a mosaic burn of vegetation cover to promote community diversity
- Maintain fire-dependent plant communities
- Foster biological diversity
- Maintain open canopy, sparse understory, and diverse herbaceous plant community
- Control native hardwood encroachment
- Enhance habitat for state and federally listed species
- Increase public acceptance of prescribed burning

4.2 Burn Manager Duties

In accordance with Florida Statutes and MDC Code, prescribed burning will be planned and carried out by a designated Certified Prescribed Burn Manager ("Burn Manager") (as licensed by the FFS) and experienced fire crews utilizing the FFS Prescribed Burn Plan form, referred to herein as the "prescription." Prior to a burn event, the Burn Manager will inspect the site. The Burn Manager will use the best professional judgment in writing a prescription that will safely and effectively meet the Off-site Mitigation Area Burn Plan objectives. Each prescription will include the following at a minimum:

- Purpose for the burn;
- Brief description of the habitat type(s) to be burned;
- A map depicting the location of the burn, firebreak locations, potential hazard areas, and escape routes for the fire crew;

- Acceptable range of weather conditions;
- Acceptable range of soil and fuel moisture;
- A pre-burn inspection of fire control cell firebreaks, and any potential hazards (including power transmission lines, and existing manmade structures) within the fire control cell;
- Firing techniques;
- Emergency action plan with actions for unexpected weather changes or fire behavior;
- Management and/or contingency plan for smoke;
- Personnel, equipment, and safety requirements;
- Personnel assignments and responsibilities; and
- Post-burn evaluation.

The Burn Manager will obtain all necessary permits and authorizations before implementation of the burn. The planning and application of prescribed burning will comply with all applicable federal, state, and local regulations. The Burn Manager will take into account the following considerations when preparing the prescription.

4.2.1 Fire Seasonality

Seasonal timing of prescribed burns will be varied, to the greatest extent practicable, to ensure a diverse community structure and composition, and to best meet individual burn objectives. Fire seasonality can affect intensity of burns. In general, winter burning is more effective for safely reducing hazardous fuel levels (Maguire 1995; Wade et al 1980). Winter burns, however are less effective in controlling invasive woody species when woody vegetation is dormant as energy reserves are being stored in the roots (DERM 1994). Alternatively, higher intensity summer burns are more likely to result in the mortality of shrubby hardwoods (Wade et al 1980). The NKDR conducts their burns during the lightning season or summer to mimic historical fire regimes (Personal Communication Nancy Finley, NKDR manager 1/12/15); however, this season can be characterized by unstable or variable winds, which may increase risks associated with burning. When burning in pine rocklands situated in urban areas, conducting burns during October through December may be preferable due to prevalent wind direction at this time of year and remaining fuel moisture following the rainy season (Personal communication Gary Lewis, FFS, 1/28/2015). Therefore, after the initial prescribed burning for all of the fire control cells is completed it is anticipated that burning will take place during the winter season, which is also outside the flight season for the MTB. Summer season burning may be considered for future prescribed burning, if practicable.

4.2.2 Weather and Fuel Considerations

Knowledge of weather and its effects on the behavior of fire is key to successful prescribed burning, and is mandatory for proper management of smoke produced by burning (Wade and Lunsford 1989). When developing the prescription, the Burn Manager will consider weather and fuel conditions, including, but not limited to: wind, relative humidity, temperature, rainfall and soil moisture, airmass stability, and atmospheric dispersion. The Burn Manager will be responsible for obtaining current weather forecasts from FFS, and other weather sources as necessary, prior to executing the prescribed burn. Preferred weather and fuel conditions will vary based on specific burn objectives, season, fuel load, and firing technique. Target prescription parameters will be identified for each planned burn in

the recommendations included in each monitoring report. These parameters may be modified by the Burn Manager prior to requesting a burn permit. In general, wind directions between 60 - 150 degrees (ESE) and 210 - 250 degrees (WNW) will allow for conditions to avoid smoke sensitive areas. Based on a review of the Miami Executive Airport's weather data for 2016, there were 207 days (over 56%) that had the desired wind directions, relative humidity and visibility to allow prescribed burning on the UM Richmond Campus (https://www.ncdc.noaa.gov/crn/ accessed September 26, 2017).

4.2.3 Firing Techniques

The Burn Manager will identify the firing techniques for each burn in the prescription. Choosing the appropriate firing technique is an important component in achieving burn objectives. Several other factors may influence the technique chosen for any given fire, such as fuels, weather, topography and smoke management (Wade and Lunsford 1989). The primary firing techniques that may be used alone, or together, within the Off-site Mitigation Area are backing, strip-heading, flanking, and pile burns, which are described below.

4.2.3.1 Backing Fire

A backing fire is a fire set along a firebreak and allowed to burn into (against) the wind. They have a relatively slow rate of spread that is not significantly influenced by wind speed. Backing fires are typically the least intense with a narrow flaming zone, and short flame lengths (Wade and Lunsford 1989). The shorter flame length reduces crown scorch of adult trees (Maguire 1995). Although backing fires are sometimes perceived as having a longer residence time than heading fires, the residence time is often about the same because the deeper flame depth of a heading fire offsets its faster movement (Wade and Lunsford 1989). Residence time should be considered in terms of flame zone residence time (duration of flaming combustion at a given location) and fuelbed residence time (amount of time to consume fuel downward into the fuelbed) (Wade 2013). The shorter flame length of a backing fire means the heat energy is closer to the ground, enhancing the downward transfer of heat (decreasing fuelbed residence time) (Wade and Lunsford 1989), which may result in the overheating of mature trees' root systems (Maguire 1995). Although conducting the burn when a higher fuel moisture is present will require more effort to keep the fire lit, it will also reduce the damage to root systems (Wade and Lunsford 1989). The higher fuel moisture can also result in a desirable mosaic burn. Because energy is focused downward, backing fires are very effective in consuming hazardous fuels. This is largely the result of the consumption of the herbaceous understory and rough, and may not result in effective control of the wood subcanopy due to the shorter flame length (Wade 2013). A backfire produces only one-third of the emissions of a headfire under the same conditions because more of the fuel is consumed during the flaming phase of combustion rather than in the smoldering phase, which translates to less production of smoke (Wade 2013). Backing fires require a steady wind direction, which often results in their application during the winter months, when wind speeds are less variable. The use of smaller fire control cells can reduce some of the risks associated with changes in wind directions resulting in a backing fire becoming a headfire.

4.2.3.2 Heading Fire

Natural fires that historically influenced Florida ecosystems where wind-driven head fires (Maguire 1995). Heading fires are the most intense because of its faster rate of spread, wider flaming zone, and longer flames (Wade and Lunsford 1989). While heading fires can be intense, they often result in a mosaic burn pattern because of their quick movement and dependence on wind, allowing the fire to skip over the landscape. Strip-heading fire involves a series of lines of fire set progressively upwind of

a firebreak in such a manner that no individual line of fire can develop high energy before it meets the firebreak or a burned area. A backing fire can be used in conjunction with a heading fire to establish a blackline, effectively securing the baseline. The meeting of two fires, however, can result in longer flame length and crown scorch. Heading fires are not as efficient in consuming fuels and can result in more smoldering, which equates to smoke, although they do provide good convective lift allowing for quick dispersion of smoke. Quick mop-up can further reduce smoke issues generated by this technique. Finally, due to higher intensity and risk of escape, they should not be used in heavy rough (where fire intervals exceed 3 years) (Wade and Lunsford 1989).

4.2.3.3 Flanking Fire

The flanking firing technique involves setting lines of fire directly into the wind (with multiple torch people) or at a 45-degree angle (with two or fewer torch people) so that it spreads at right angles to the wind. The fire intensity is less intense than a heading fire but more intense than a backing fire. It may be used to secure the flanks of a strip-heading fire or to supplement a backing fire in areas of light fuel or under more humid weather conditions. It is useful in a small area when heading fires would be too intense. It can tolerate light to medium fuel loads but should not be conducted when fuel loads are at hazardous levels (Wade and Lunsford 1989).

4.2.3.4 Point Source Fire

Point source fires involve setting a line or grid of spot ignitions rather than laying down a continual ignition line. They can effectively reduce the intensity of a fire and can assist in creating a mosaic burn pattern. Spacing is key to the use of this method as igniting the spots too close to each other can result in converging fires, which rapidly increases the intensity of the fire. As in strip head firing, the downwind firebreak must be secured, most commonly by blacklining. Wind direction can be variable but stand wind or surface winds must be low (1-2 mph), and fine fuel moisture should be above 15 percent (Wade and Lunsford 1989).

4.2.3.5 Pile Burn

The objective of pile burning is to prolong fire residence time on a restricted area for the purpose of burning larger material. This technique is commonly used to dispose of logging or thinning debris. Care should be taken with the placement of piles because the debris is rarely consumed completely and what remains can inhibit regrowth of vegetation from under the pile, as well as restricting planting (Wade and Lunsford 1989). There are also local restrictions and setbacks on pile burning. Piles greater than 8 feet in diameter require authorization from the FFS, must have suppression equipment on hand, and need to meet additional setback requirements. The setbacks for non-residential clearing are 1,000 feet from any occupied building, 100 feet from any paved public road and 100 feet from any wildland (http://www.freshfromflorida.com/Divisions-Offices/Florida-Forest-Service/Wildland-Fire/Resources/FAQs-for-Open-Burning-in-Florida accessed 1/29/15). Pile burning can be problematic in that it produces large amounts of smoke due to prolonged smoldering from higher moisture content and lower oxygen levels. Reducing the amount of soil in a pile, keeping the piles small and allowing them to dry before burning can reduce the amount of smoke generated. Constructing the pile to allow air movement through it and igniting the center of the pile will allow the debris to be consumed quicker, producing less smoke (Wade and Lunsford 1989).

4.2.4 Smoke Management

Smoke management is an essential component of the burn prescription. The FFS authorization of a burn permit relies on a state-of-the-art weather forecasting model regarding smoke dispersion conditions. This GIS model forecasts size and direction of the smoke dispersion plume, allowing FFS to predict impacts to smoke-sensitive areas. The Burn Manager will conduct an evaluation of each prescribed burn to areas located within a 20-mile radius from the location of the burn by employing a Screening System, such as recommended in Wade and Lunsford (1989) or the FFS's Forestry Smoke Screening Tool (http://flame.fl-dof.com/wildfire/tools_sst.html accessed 1/29/15). Based on definitions contained within the state regulations, smoke sensitive areas are areas within which smoke could have an adverse impact for reasons of visibility, health or human welfare (Natural Resources Conservation Service 2014). Monitoring of the prescribed burn will continue until the potential for the fire to affect smoke sensitive areas or reignite and cause an uncontrolled fire is minimized to extent practicable. Keeping pine rocklands on a regular burn regime will reduce heavier fuels (the chief contributors to smoke events), so they do not accumulate as rapidly. As a result, smoke management is simplified because the duration of smoke events is shorter and "mop-up" is reduced (Maguire 1995).

Specific smoke management strategies may use, to the extent practicable, are as follows:

- Minimize fuel loads prior to burning through mechanical treatments;
- Reduce heavy fuels such as woody vegetation and downed trees, which cause heavy smoke output and increase fine fuels such as herbaceous grasses, which are easily combustible and produce less smoke;
- Burn when weather and fuel moisture conditions will minimize smoke production;
- Conduct burns when winds are blowing away from smoke sensitive areas;
- Burn when atmospheric dispersion index is 41 or greater (as defined by the Florida Forest Service);
- Utilize firing technique that will best minimize smoke while meeting burn objectives;
- Mop up immediately following flame front;
- Keep fire control cells approximately 2 to 16 acres;
- Mop up heavy fuels within 50 feet of control lines;
- Place smoke signals on public roads adjacent to burn areas;
- Mop up activities, when practicable, will avoid pooling water within these areas.

4.3 Burn Plan for the Fire Control Cells

The Burn Manager will coordinate with UM to recommend land management activities and fuel reduction activities. Fire control cells will be evaluated based on site conditions, previous land management activities, and burn objectives. The recommendations will identify and prioritize management actions for each management fire control cell and develop an implementation schedule. Before each prescribed burn, a pre-burning meeting will be conducted at the facilities on the UM Richmond Campus to discuss the proposed burn plan activities and timing.

The burn plan will commence upon issuance of all requisite permits. Prior to implementing the initial burn, this Off-site Mitigation Area Burn Plan proposes to implement canopy reduction (pine thinning) and understory reduction based on recommendations by the Burn Manager. The goal is to implement the burn plan in three phases in one year with one to four months intervals between each phase. The intervals will be based on observed native plant regrowth within the previous burned phase.

The first phase of burning will include fire control cells 11, 12 and 14. The second phase of burning will occur in fire control cell 13, and the third phase of burning will include fire control cells 10 and 15. See **Attachment 1** for fire control cells.

Following the initial fire to the fire control cells, burns will occur in a mosaic pattern, with fire applied in alternating fire control cells. Long-term management of the site is anticipated to involve approximately 6-16 acres being burned a year. See **Table J1-4-1** for Years 1-5 burn schedule and **Attachment 1** for fire control cells. While the goal is to burn all of the management units in Year 1, the burn schedule in Table J1-4-1 provides a conservative schedule.

Table J1-4-1. UM Richmond Burn Schedule – Years 1-5*

Year 1 Fire Control Cells	Year 2 Fire Control Cells	Year 3 Fire Control Cells	Year 4 Fire Control Cells	Year 5 Fire Control Cells
11,12,14	13	10,15	11,14	13
16.42 acres	15.74 acres	16.35 acres	12.63 acres	15.74 acres

*Cells and acres referenced subject to change based on ecological conditions.

4.4 Post-Burn Evaluation

The Burn Manager will conduct a post-burn evaluation within one week following each burn event. A post-burn evaluation is used to ensure the objectives of the burn were attained and gain information to be used in future burns (Wade and Lunsford 1989). UM will report the post-burn evaluation notes to USFWS. In addition, a summary of the management activities conducted, management results and recommendations for the upcoming year's management activities will be submitted annually to the USFWS and FWC for the duration of the permit.

5.0 COST ESTIMATE[1]

The following cost estimate includes the work either being conducted by a private contractor or the FFS. Prior to implementing prescribed burning, pine thinning will be conducted on approximately 38 acres. According to the USDA Forest Service, "the cost of mechanical treatments can vary depending on the site, equipment used, and whether it is done in-house or contracted. In general, the per-acre cost can range from $100 to $500 per acre." (O'Brien et al. 2010). The FFS cost estimate for the pine

[1] In addition to the citations indicated, cost estimates for the referenced work are based on best professional judgment and experience.

thinning assumes $500 per acre and is $14,000. For a private contractor, the estimated cost for pine thinning is approximately $2,000 per acre based on site specific conditions (Possley et al. 2014).

In addition to the cost of prescribed burning, the cost estimate includes maintenance of firebreaks and potential cost of rental equipment. The FFS estimated cost for burning, maintenance of firebreaks and potential rental of equipment is approximately $750 per acre. For a private contractor, the estimated cost for burning is approximately $1,600 per acre based on site specific conditions (Possley et al. 2014).

For Year 1, the combined cost of pine thinning and prescribed burning ranges from $27,000 to approximately $133,000. The cost estimate for prescribed burning in Years 2 and 3 is approximately $10,000 to $25,000. For Years 4 and 5 the estimated cost is $6,000 to $20,000. **Table J1-5-1** provides a summary of the annual costs for the Off-site Mitigation Area Burn Plan.

Table J1-5-1. UM Richmond Burn Plan Cost Estimate

Activity	**Annual Costs**				
	Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**
Pine Thinning	$14,000 - $108,000	N/A	N/A	N/A	N/A
Prescribed Burning	$13,000 - $25,000	$10,000 - $25,000	$10,000 - $25,000	$6,000 - $20,000	$6,000 - $20,000
Total by Year	**$27,000 - $133,000**	**$10,000 - $25,000**	**$10,000 - $25,000**	**$6,000 - $20,000**	**$6,000 - $20,000**
				Total Cost	**$59,000 - $223,000**

The long-term management costs for the On-site Conservation Areas and Off-site Mitigation Area are included in Section 11.2.2 of the HCP.

6.0 REFERENCES

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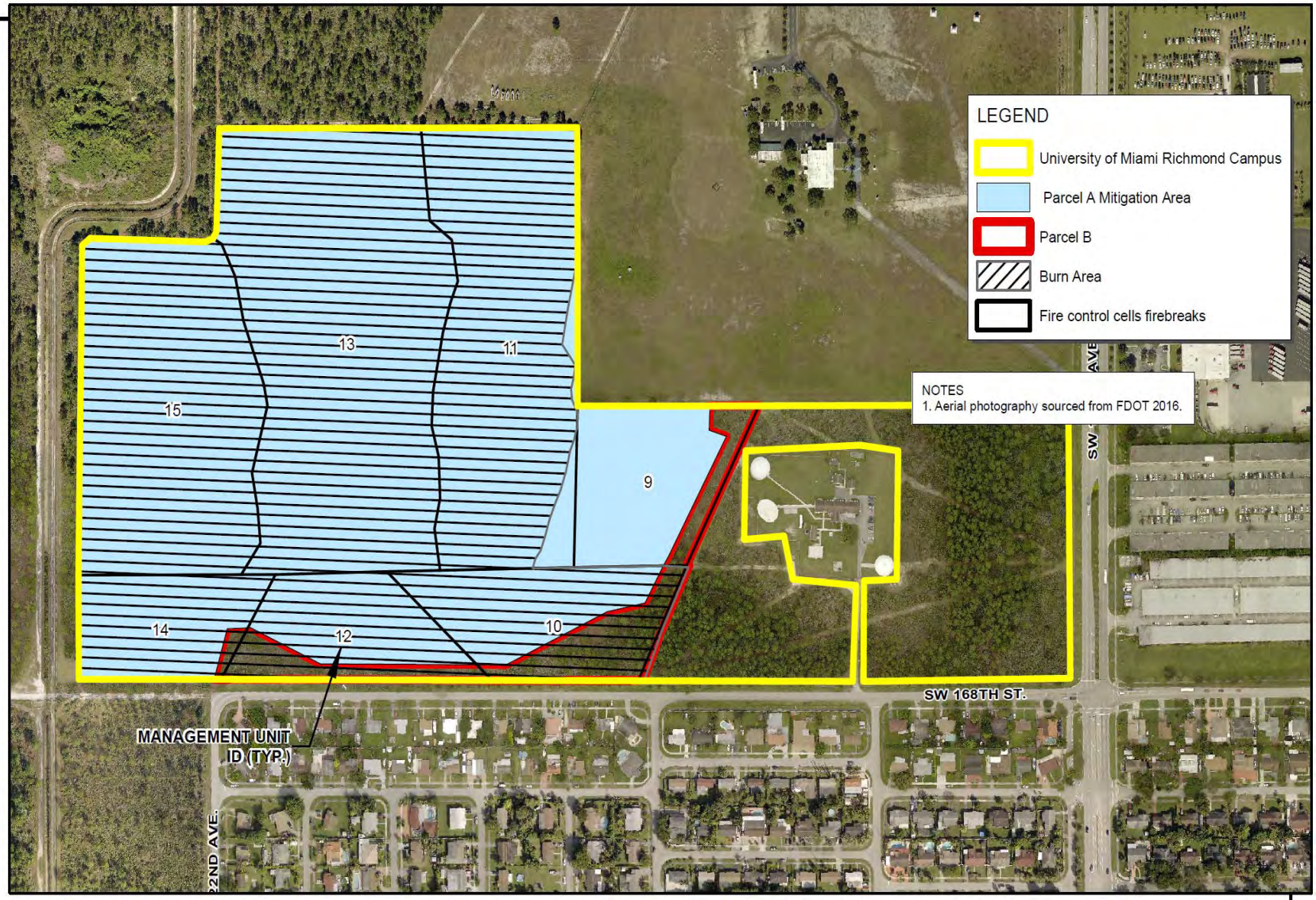
ATTACHMENT 1

University of Miami Richmond Campus Off-site Mitigation

University of Miami Richmond Campus Off-site Mitigation



CHURCH Environmental

Coral Reef Commons

Miami-Dade County, Florida

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SCALE IN FEET