Appendix I – Non-burning Alternatives and Air Emissions Reduction Techniques for Fuel Reduction and Resource Benefiting Prescribed Burns in GGNRA

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Smoke management practices referenced in mitigation measure AIR-1 of the FMP FEIS are outlined in this Appendix. The sources of this information are the Smoke Management Guide for Prescribed and Wildland Fire (NWCG 2001) and Non-burning Alternatives to Prescribed Fire on Wildlands in the Western United States (Jones and Stokes 2004), prepared for the Fire Emissions Joint Forum of the Western Regional Air Partnership.

Techniques for emissions reduction can be grouped in four main categories:

- reducing the area burned;
- reducing fuel loading (e.g., mowing and understory thinning);
- managing the rate of fuel consumption; and
- redistributing the emissions from prescribed burning.

Techniques for Reducing the Area Burned:

- Burn Concentrations. Burn only areas of the site with highest fuel concentrations and avoid intervening areas of low fuel loading.
- Isolate Fuels. Avoid areas of highest fuel concentrations that will smolder the longest by building a protective fire line, applying foam or using natural barriers. Fuel concentrations can also be reduced by scattering the fuels before firing or avoiding direct ignition to the specific areas.
- Mosaic Burning. Burn during periods of higher natural fuel moisture levels to mimic natural wildfire patterns by allowing burning to proceed in patches to form a mosaic landscape around more resistant features such as wetlands, hardwoods and wetter live fuels.

Techniques for Reducing Fuel Loading (used in conjunction with prescribed burning or alone as an alternative to burning):

- Site Conversion. Scheduling more frequent, less intense burns to prevent unwanted vegetation from becoming established in clearings or in forest understory.
- Mechanical Removal. Mowing grass and reducing density of vegetation in brushlands. Understory thinning, thinning of forests, and creation of shaded firebreaks.
- Firewood Sales. Mechanically removing fuels from a site to be burned elsewhere as firewood,
- Biomass utilization. Chipping vegetation for off-site use in landscaping, weed suppression, composting material or for reuse as lumber or in the production of paper, methanol, wood pellets, etc.
- Biomass for Electrical Generation. Chipping or shredding of vegetation for biomass fuel for cogeneration power plants.

- Ungulates. Use grazing to reduce fuels prior to burning.
- Chemical treatment. Reduce or remove live vegetation through herbicide application.
- Burn when large diameter woody fuels are wet can result in lower fuel consumption and less smoldering. This can be used to limit large fuels and organic layer consumption and significantly reduce emissions.
- Burn when the organic duff layer is wet focusing burning on surface fuels. Most effective in non-fire adapted forest and brush types to reduce fuels. Conditions occur directly following a soaking rain.
- Burn before a precipitation event to limit the consumption of large woody material and reduce the smoldering period.
- Burn within 3 or 4 months after mechanical reduction before large fuels cure.
- Burn before litter fall so there is less fuel consumed and less smoke generated.
- Burn before green-up and growth of grasses or herbaceous shrubs.

Techniques for Managing the Rate of Fuel Consumption:

- Burn piles or windrows to generate greater heat and burn more efficiently.
- Burn using a backing fire to achieve more flaming and less smoldering.
- Burn under dry conditions in areas where most fuel would be consumed whether burned under wet or under dry conditions.
- Employ rapid mop-up techniques to reduce smoldering of large woody fuels, stumps, snags and duff.
- Burn through mass ignition to cause rapid consumption of dry, surface fuels.
- Burn with an air curtain incinerator.

Techniques for Redistributing the Emissions from Prescribed Burning:

- Burn when dispersion is good.
- Share the airshed through cooperation and BAAQMD approvals.
- Burn during favorable wind direction that direct smoke away from sensitive receptors.
- Burn smaller units over multiple days.
- Burn more frequently to prevent fuels from building up.