

## CHAPTER D

# Airfield Alternatives Analysis

---

### Introduction.

This chapter presents and evaluates the comprehensive planning considerations and alternatives associated with the future configuration of Renton Municipal Airport (RNT or Airport). This chapter considers the aviation demand as determined in Chapter B, the facility requirements as determined in Chapter C, and it recognizes input received from the Renton Airport Advisory Committee (RAAC), airport staff, the public and the Federal Aviation Administration (FAA) throughout the drafting process of previous chapters.

### Assumptions.

There are a number of fundamental reasoning assumptions which are driving this planning process, and which influence the basis for the recommended long-term development program for the Airport. Consideration factors associated with these assumptions are the role of the Airport, the role of the RAAC, the goals and objectives described in the 2012 Sustainability Management Plan (SMP), and stakeholder input received to date during this planning process. For reference purposes, the existing airfield is illustrated on the following figure entitled *EXISTING AIRFIELD CONDITIONS*. Eleven basic assumptions have been established to direct this alternatives analysis and future development at RNT:

#### **Assumption One: No change to aircraft fleet mix.**

The Airport will continue to serve as a reliever airport that accommodates primarily general aviation activity, as well as a small amount of military activity, and Boeing 737 manufacturing related activity (primarily 737 departures).

#### **Assumption Two: Recommended improvements must comply with local, state and federal regulations.**

The Airport will be developed and operated in a manner that is consistent with local ordinances and codes, federal and state statutes, federal grant assurances, and Federal Aviation Administration (FAA) regulations.

#### **Assumption Three: Future airport layout must accommodate the critical aircraft for each facility.**

The size and type of the critical aircraft at RNT and the resulting setback and safety criteria are used as the basis for the future layout of airport facilities. The critical aircraft for each runway and taxiway facility at Renton Municipal Airport are as follows:

Runway 16/34. The critical aircraft for Runway 16/34 is a combination of the Lear 45 for approach speed (Approach Category D), and the Boeing 737 for wingspan (Design Group III) resulting in a Runway Design Code (RDC) of D-III. The Airport does not presently meet many of the FAA RDC D-III design standards and dimensional criteria; therefore, a primary goal of this analysis is to develop alternatives that meet these standards.

# Master Plan

Parallel Taxiway A and Connector Taxiways A1, A6 and A7. The critical aircraft types for taxiway design are based on wheelbase and wingspan. For planning purposes, the Boeing 737 (TDG 3, ADG III) is the critical aircraft type for these taxiways.

Parallel Taxiway B, and Connector Taxiways B6 and B7. For planning purposes, the Boeing 737 (TDG 3, ADG III) is the critical aircraft type for these taxiways.

Connector Taxiways A2, A3, A4 and A5 and B7. For planning purposes, the King Air 200, (TDG 2, ADG II), is the critical aircraft type for these taxiways.

Parallel Taxiway B and Connector Taxiways B6 through B3. For planning purposes, the Beechcraft Bonanza (TDG 1B, ADG I) is the critical aircraft type for these taxiways.

## **Assumption Four: Runway layout requires continued use of declared distances to meet Runway Safety Area (RSA) Standards.**

The Airport currently publishes declared distances to meet existing RSA standards off both ends for Runway 16/34. Given the physical land envelope constraints north (lake Washington) and south (urban development) of the Airport, continued use of declared distances is necessary to reasonably achieve RSA design standards at each runway end since the length of the RSA must increase from 300 feet with RDC B-II to 1,000 feet with RDC D-III. Alternatives without the use of declared distances would require over 7,000 feet of combined runway and RSA length, which is not physically or financially feasible given RNT's physical site constraints. Furthermore, the RSA is the only design standard for which FAA will not grant a modification of standards (MOD); therefore, each alternative airfield concept must be based on a layout that meets the D-III RSA design standard criteria.

Finally, alternatives should be developed in accordance with FAA Order 5200.8 Runway Safety Area Program and FAA Order 5200.9 Financial Feasibility and Equivalency of Runway Safety Area Improvements and Engineered Material Arresting Systems.

## **Assumption Five: Existing runway takeoff and landing lengths must be maintained.**

Runway 16/34 has an existing available takeoff length (published accelerate stop distance or ASDA) of 5,042 feet for takeoff to the north, and 5,082 feet for takeoff to the south, and an available landing length of 4,742 feet in both directions. These takeoff and landing lengths must be maintained to appropriately accommodate the critical aircraft.

## **Assumption Six: Future landside development should include storage for general aviation aircraft.**

The area available for landside development is limited at RNT and airfield improvements necessary to meet FAA design standards will require removing some general aviation hangars. Therefore, future landside development must use the available area for aviation-related activities efficiently, and accommodate the existing and future demand for general aviation aircraft storage.

## **Assumption Seven: Future airport development must align with local economic development goals.**

The Airport is to be developed to complement and enhance on-airport and off-airport regional economic development activities in accordance with the economic growth goals of the Airport and the City of Renton.

# Master Plan

**Assumption Eight: Future airport development must consider surrounding land use compatibility.**

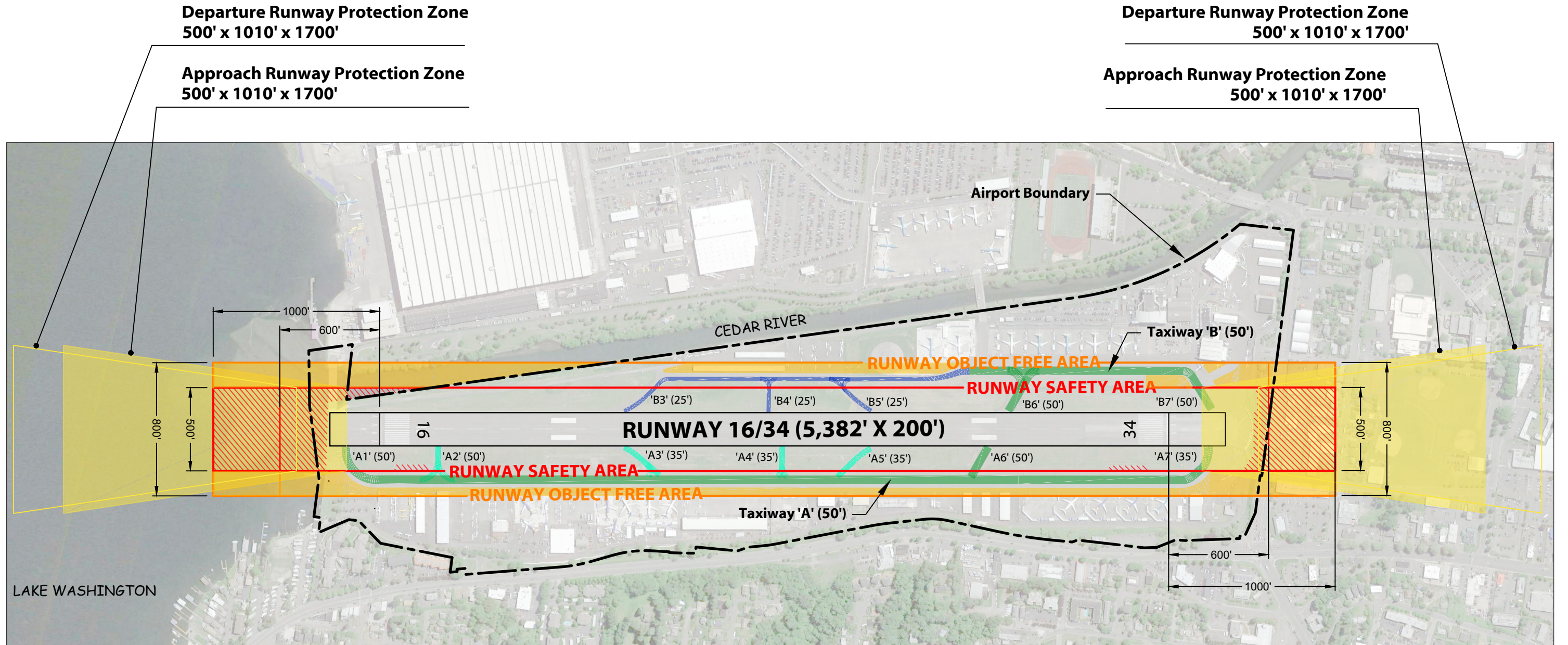
The relationship between off-airport development and land use compatibility is inherent in the design considerations of RNT's future layout. The location of future airport development must consider the existing and proposed land uses surrounding the Airport to ensure the continued compatibility of surrounding land uses with the daily operation of the Airport.

**Assumption Nine: Future airport development must consider the goals and objectives of the Sustainability Management Plan (SMP).**

To the extent possible, the goals and objectives outlined in the SMP will be used to connect possible screening criteria and metrics for the alternatives under consideration in this Airport Master Plan.

**Assumption Ten: Some non-standard conditions will be addressed later.**

The comprehensive airfield alternatives will address the major non-standard conditions described in the previous chapter including non-standard RSA, RPZ, ROFA, OFZ and runway/taxiway separation. Additional non-standard conditions such as airfield markings, taxiway fillets and radii, Part 77 penetrations and vehicle service roads will be addressed once a preferred airfield alternative has been selected.



**LEGEND**

- |                                           |                                                  |
|-------------------------------------------|--------------------------------------------------|
| Existing Property Line                    | Departure RPZ                                    |
| Runway Safety Area (RSA)                  | Approach RPZ                                     |
| Runway Safety Area (RSA) Deficiency       | Airplane Design Group I/Taxiway Design Group 1B  |
| Runway Object Free Area (ROFA)            | Airplane Design Group II/Taxiway Design Group 2  |
| Runway Object Free Area (ROFA) Deficiency | Airplane Design Group III/Taxiway Design Group 3 |

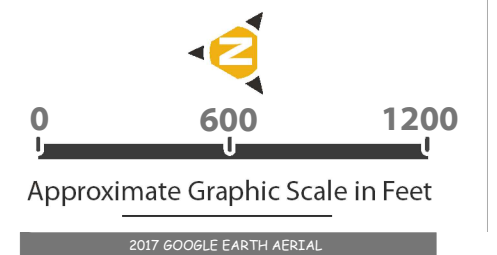


FIGURE D1 Existing Airfield Conditions

# Master Plan

## Goals for Development

The Master Plan assumptions described in the previous section were established to guide the development of comprehensive airfield alternatives that meet FAA design standards, and to align with other previously established goals and objectives at RNT. Specifically, the assumptions of this study are directly related to the sustainability objectives of the SMP. Primary goals of the SMP relate to achieving financial viability and operational efficiency, while conserving natural resources and acting in a socially responsible manner. The objectives of the Airport's SMP are organized under seven categories:

### 1- Airport Finance

- a. Provide an economically stable asset that contributes to the community;
- b. Balance expenditures with revenue to remain financially self-sufficient in the long- term;
- c. Improve revenue to provide for future development opportunities; and
- d. Provide financial capacity that will enable the Airport to pursue sustainability initiatives in the future.

### 2- Airport and Local Economic Values

- a. Attract airport tenants and aircraft operations that add economic value to the local economy;
- b. Continuously improve as a tier one supplier for Boeing aircraft manufacturing;
- c. Diversify tenants and aviation services for land and sea based operations; and
- d. Increase employment.

### 3- Community Outreach and Education

- a. Continuously improve the airport's relations with the surrounding neighborhoods and with airport tenants; and
- b. Raise community awareness of airport services and value to regional employment.

### 4- Energy Consumption /Greenhouse Gases

- a. Reduce energy consumption without adversely affecting the Airport or its tenants; and
- b. Reduce Airport owned greenhouse gas emissions.

### 5- Noise from Aircraft Operations

- a. Maintain 65 DNL noise contour on airport property; and
- b. Minimize aircraft noise over neighborhoods.

### 6- Operations, Maintenance, Capital Improvements of Airport Facilities

- a. Maintain a safe airport on a daily basis; and
- b. Maintain airport and seaplane infrastructure in good condition.

### 7- Water Quality

- a. Reduce stormwater runoff quantity; and
- b. Improve stormwater quality.

# Master Plan

## Alternatives Screening Criteria

The sustainability goals listed above were reviewed for applicability to the alternatives development process and how they could be coupled with the assumptions to create a list of initial screening criteria that are consistent with these sustainability goals and assumptions. The list included in the following table, *AIRFIELD ALTERNATIVES SCREENING CRITERIA* is only an initial list and the consultant team will be working with the RAAC and the City to refine and expand this list over the coming months. The criteria also fit into the Airport Council International-North America’s (ACI-NA’s) definition of sustainability which includes Economic, Operational, Natural resources, and Social (EONS).

Table D1 AIRFIELD ALTERNATIVES SCREENING CRITERIA

| EONS Category         | Screening Criteria                        | SMP Goal/Objective from SMP (see page 3) |
|-----------------------|-------------------------------------------|------------------------------------------|
| (E) Economic          | Construction cost                         | 1-b/c/d                                  |
| (E) Economic          | Land acquisition cost                     | 1-b/c/d                                  |
| (O) Operational       | Effect on Airport operations              | 2-a/b/c/d                                |
| (O) Operational       | Land acquisition requirements             | 3-a                                      |
| (O) Operational       | Safety/RSA standards                      | 6-a                                      |
| (O) Operational       | Safety/RPZ standards                      | 6-a                                      |
| (O) Operational       | Road closures/relocation                  | 3-a                                      |
| (O) Operational       | Seaplane pull out/dock impacts            | 6-b                                      |
| (N) Natural resources | Energy                                    | 4-a                                      |
| (N) Natural resources | Impervious surface/Fill into Waters of US | 7-a/b                                    |
| (S) Social            | Subsistence resource impacts              | 3-a                                      |
| (S) Social            | Displacement of businesses/residences     | 3                                        |
| (S) Social            | Noise change                              | 3                                        |
| (S) Social            | Recreation/parks                          | 3-a                                      |

SOURCE: Mead & Hunt and Synergy Consultants.

The following sections include a description of each alternative, as well as a table of components of each alternative.

# Master Plan

## Airfield Alternatives

This section describes and evaluates seven comprehensive airfield alternatives, which were developed to address the non-standard conditions identified in the previous chapter. FAA guidance states that RSA standards must be met and cannot be modified; therefore, each comprehensive airfield alternative presented in this section was developed to completely correct the existing non-standard RSA conditions first, and then address the remaining non-standard conditions. Several fundamental development considerations were identified as part of the approach to best meet D-III RSA standards at RNT through the year 2035.

Because all airport functions relate to and revolve around the basic runway layout, airfield alternatives must first be carefully examined and evaluated to meet standards and operational necessity. Specific considerations include runway capacity, runway length, as well as runway orientation and approach protection criteria needed to support forecast use through the planning period. The dimensional criteria associated with the RSA off each end of Runway 16/34, as described in the previous chapter, are 1,000 feet long by 500 feet wide for aircraft overrun protection and 600 feet long by 500 feet wide for aircraft undershoot protection. In other words, more cleared and graded area is required off each end of the runway to support an aircraft overrun than what is required prior to the landing threshold for an aircraft that potentially lands short. This is important at RNT given the existing displaced thresholds and published declared distances.

*FAA Order 5200.8, Runway Safety Area Program* states that once it has been determined that an RSA is deficient, the first alternative to be considered in every case is constructing the traditional graded area surrounding the runway. Should it be determined that traditional graded RSA is not feasible, the following alternatives should be considered and addressed in the supporting documentation; however, applicability is dependent on location:

- a) Relocation, shifting, or realignment of the runway;
- b) Reduction in runway length where the existing runway length exceeds that which is required for the design aircraft;
- c) A combination of runway relocation, shifting, grading, realignment or reduction;
- d) Declared distances; and
- e) Engineered Materials Arresting Systems (EMAS).

Based on the results of the runway length analysis in the previous chapter, neither a reduction in runway length nor realignment of the runway is feasible given the surrounding terrain and the proximity of the Airport to Lake Washington and the Cedar River. Consequently, FAA's RSA Program alternative b. (listed above) is not applicable; therefore, it is not explored further in the alternatives analysis.

Furthermore, a lateral shift of Runway 16/34 is not feasible as the Cedar River prevents a shift to the east, and a shift to the west would eliminate the parallel taxiway, or significantly reduce the runway/taxiway separation and limit the existing aeronautical development on the west side of the Airport. The rising terrain west of the Airport would also preclude the ability to expand the airport property boundary farther to the west.

# Master Plan

Within the context of “a” through “e” above, the following airfield alternatives have been identified:

- Alternative 1A: Traditionally Graded RSA w/out Declared Distances
- Alternative 1B: Traditionally Graded RSA w/Declared Distances
- Alternative 2: Declared Distances w/South Shift
- Alternative 3: Declared Distances w/North Shift
- Alternative 4: Declared Distances and Engineered Materials Arresting System (EMAS) w/South Shift
- Alternative 5: Declared Distances and EMAS w/North Shift
- Alternative 6: Declared Distances w/EMAS North and Traditional Graded RSA South





# Master Plan

## Alternative 1A – Traditional Graded RSA w/out Declared Distances

As explained in the previous chapter, the Airport does not currently meet RSA dimensional criteria standards for RDC D-III (laterally and off each runway end). *FAA Order 5200.8, Runway Safety Area Program* states that following a determination of a deficient RSA at an airport, the first alternative to be considered in every case is constructing the traditional graded safety area surrounding the runway. Then, where it is not practicable to obtain the entire RSA in this manner, as much as possible should be obtained.

Given the proximity of Lake Washington to the north, Airport Way and urban development to the south and the Cedar River to the east, it is not practicable to obtain traditional graded RSA at both runway ends, according to *FAA Order 5200.9, Financial Feasibility and Equivalency of Runway Safety Area Improvements and Engineered Material Arresting Systems*, which defines practicability. In the case of RNT, according to charts in the Order 5200.9, the practicability threshold for RSA improvements would be approximately \$15 Million. This threshold needs to be confirmed by the FAA Northwest Mountain Region likely following completion of the Master Plan. However, for comparative purposes, Alternative 1A was developed to identify both the amount of land acquisition that would be required, as well as the amount of fill material that would need to be placed in Lake Washington to construct a traditional graded RSA at the north end. The lateral RSA associated with the penetration by the Cedar River is addressed in all seven alternatives by realigning the river channel and relocating/reconstructing the north bridge.

Alternative 1A, shown in **Figure D2**, illustrates the amount of land that would need to be cleared at each runway end for traditional graded safety areas without the use of declared distances to achieve the recommended runway length (5,300 feet), as identified in the previous chapter. This alternative shows 1,000 feet of traditional graded safety area beyond each runway end. At the south end, this alternative requires closing the section Airport Way between Rainier Ave. and Shattuck Ave. Under Alternative 1A, the runway remains in its current location, and the thresholds are relocated at both ends to achieve the recommended runway length of 5,300 feet. This alternative would require that the Airport acquire 49 parcels of land for safety area improvements, consisting of approximately 37.9 acres with a total assessed value of \$43.2 Million. Alternative 1A requires land acquisition of the Renton High School ball fields and the acquisition of 11.6 acres of Lake Washington for RSA improvements.

To comply FAA RPZ land use guidance, this alternative would also require the acquisition of 13 parcels for RPZ protection, which consists of approximately 9.1 acres valued at \$18 Million.

To meet FAA D-III runway/taxiway separation standards, both taxiways are shifted 100 feet out from the existing runway centerline. This taxiway relocation/shift results significant changes to the west side of the Airport requiring relocation of the Airport Traffic Control Tower (ATCT) outside the taxi object free area (TOFA), partial (or total) demolition of existing hangars within the TOFA, and elimination of most existing 737 aircraft parking areas on the west side of the Airport. The seaplane dock and pull out area would also be relocated. Alternative 1A is summarized in the following, **Table D2 ALTERNATIVE 1A – TRADITIONAL GRADED RSA W/OUT DECLARED DISTANCES SUMMARY**.

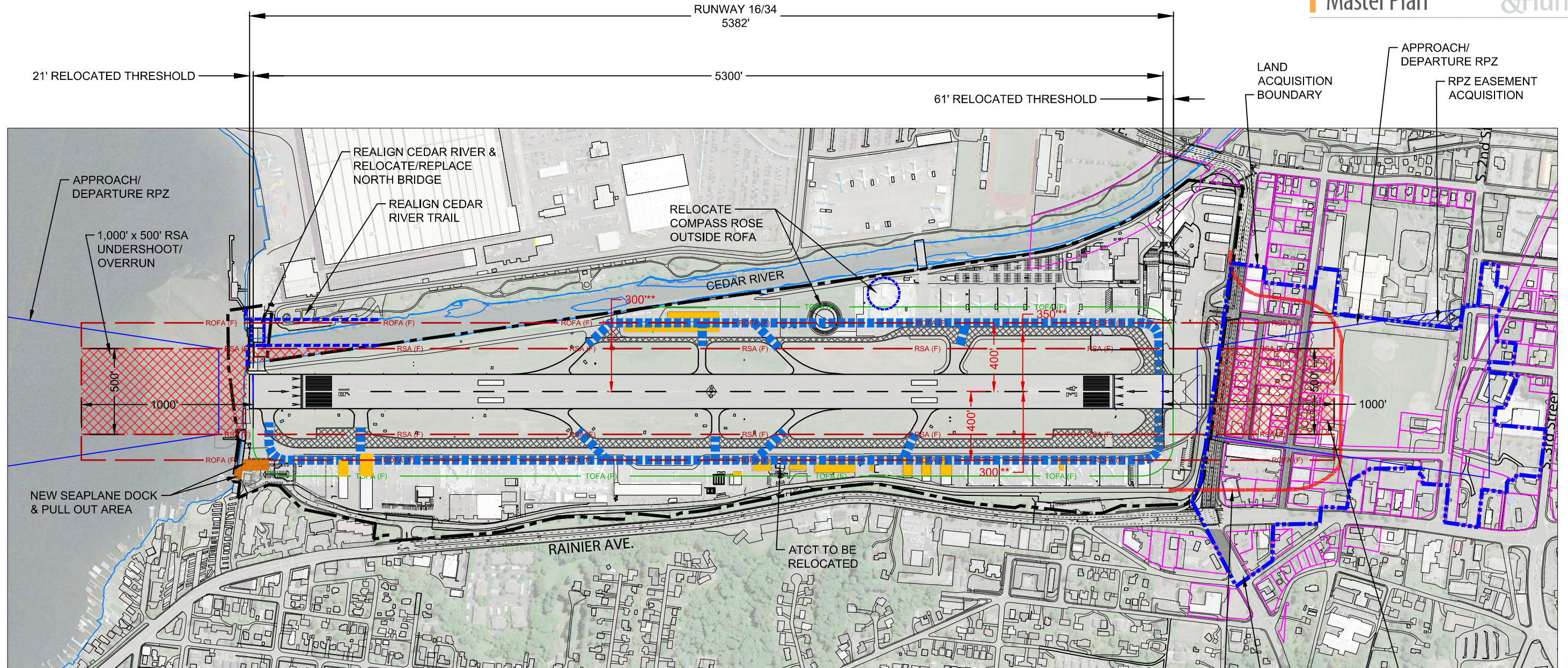
# Master Plan

Table D2 ALTERNATIVE 1A – TRADITIONAL GRADED RSA W/OUT DECLARED DISTANCES SUMMARY

| Airfield Condition                       | Improvements Required to Meet RDC D-III Design Standards                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Runway 16/34 Location and Length</b>  | <ul style="list-style-type: none"> <li>Minor change to runway location; and</li> <li>Takeoff runway available is 5,300' in both directions.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Declared Distances</b>                | <ul style="list-style-type: none"> <li>N/A</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Runway Safety Area (RSA)</b>          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <i>RW 16 End</i>                         | <ul style="list-style-type: none"> <li>Traditional graded RSA is achieved by adding fill material (11.6 acres) into Lake Washington to construct a land mass approximately 500' wide x 1,000' long;</li> <li>Cedar River and portion of Cedar River Trail Park are realigned; and</li> <li>North bridge is relocated/replaced (recently replaced in 2014).</li> </ul>                                                                                                                                                                |
| <i>RW 34 End</i>                         | <ul style="list-style-type: none"> <li>Safety area achieved by expanding Airport property boundary to the south to construct a traditional graded RSA approximately 500' wide x 750' long;</li> <li>Airport Way is closed, and the Perimeter road is relocated outside of the RSA;</li> <li>Portions of S. Tillicum, S. Tobin Streets, and Lake Ave S. are closed; and</li> <li>Land acquisitions required for safety area improvements include 49 parcels (approximately 37.9 acres) with an assessed value of \$43.2 M.</li> </ul> |
| <b>Object Free Areas (ROFA and TOFA)</b> | <ul style="list-style-type: none"> <li>Hangars (or portions of hangars) penetrating ROFA and TOFA are demolished;</li> <li>Parking spaces penetrating ROFA and TOFA are eliminated (including all Boeing parking spaces on Ramps A and B);</li> <li>ATCT and Airport Administration building are relocated outside TOFA; and</li> <li>Seaplane dock and ramp are relocated.</li> </ul>                                                                                                                                               |
| <b>Runway Protection Zone (RPZ)</b>      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <i>RW 16 End</i>                         | <ul style="list-style-type: none"> <li>Approach/departure RPZs shift 21 feet with relocated threshold.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <i>RW 34 End</i>                         | <ul style="list-style-type: none"> <li>Approach/departure RPZ shifts 61' south with relocated threshold;</li> <li>Land acquisition for RPZ protection is 13 parcels (approximately 9.14 acres with assessed value of \$18 M);<sup>1, 2</sup> and</li> <li>RPZ property acquisition and road closures eliminate some incompatible land uses, but relocated Perimeter Road introduce new incompatible land uses within RPZ.</li> </ul>                                                                                                 |
| <b>Runway/Taxiway Separation</b>         | <ul style="list-style-type: none"> <li>Taxiway A is relocated, and centerline shifts 100' west for 400' runway centerline separation; and</li> <li>Taxiway B is relocated, and centerline shifts 100' east for 400' runway centerline separation.</li> </ul>                                                                                                                                                                                                                                                                         |

NOTE: <sup>1</sup> Does not include City or Renton owned parcels.

<sup>2</sup> Land acquisition cost estimate is based on total assessed value in 2017 plus 20% contingency.



**Notes:**  
 \* Airport Way and portions of Tilicum St., Tobin St. & Lake Ave. to be closed. Airport Way traffic between Renton Ave. and Logan Ave. would be redirected to 2nd & 3rd streets.

**Disclaimer:**  
 This illustration is for study purposes only, based on national FAA standards, and is not necessarily intended for implementation. For further information please see Chapter D of the Airport Master Plan and the FAQ document on the Airport's website.

**LEGEND**

- EXISTING PROPERTY LINE
- FUTURE FUTURE PROPERTY LINE
- ROAD CLOSURE
- FUTURE ROADWAY ALIGNMENT
- FUTURE RUNWAY SAFETY AREA (RSA)
- FUTURE RUNWAY OBJECT FREE AREA (ROFA)
- FUTURE TAXIWAY OBJECT FREE AREA (TOFA)
- FUTURE TAXIWAY
- FUTURE RUNWAY SAFETY AREA EXPANSION
- TAXIWAY TO BE REMOVED
- FUTURE RPZ EASEMENT
- PROPOSED BUILDING/FACILITY DEMOLITION
- FUTURE SEAPLANE DOCK
- FUTURE ENGINEERED MATERIAL ARRESTING SYSTEM (EMAS)

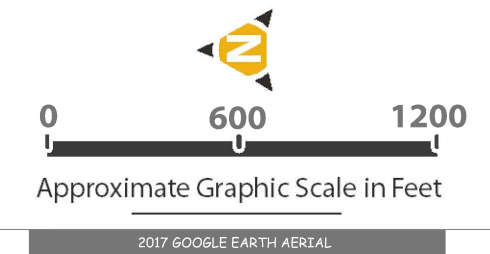


FIGURE D2 **Alternative 1A - Traditional Graded RSA without Declared Distances**

**COST ESTIMATE = \$176 M**

**Renton Municipal Airport/  
Clayton Scott Field**

# Master Plan

## Alternative 1B – Traditional Graded RSA with Declared Distances

Like Alternative 1A, Alternative 1B proposes a traditional graded RSA (laterally and off each runway end) meet FAA RDC D-III safety area standards; however, Alternative 1B utilizes declared distances. Declared distances are the distances that an airport owner declares for a turbine powered aircraft's takeoff run available (TORA), takeoff distance available (TODA), accelerate-stop distance available (ASDA), and landing distance available (LDA). Alternative 1B, shown in **Figure D3**, illustrates that the advantage of utilizing declared distances is a reduction in the length necessary for clearing the land required for a traditional graded RSA at each runway end. There is existing a 340-foot displaced threshold at the south end of the Airport, and a 300-foot displaced threshold at the north end of the Airport. Runway 16 provides 5,042 feet of takeoff runway length (shown as ASDA on the following illustration) and LDA. Runway 34 provides 5,082 feet of runway take off length and LDA.

Alternative 1B would also require realigning the Cedar River and Cedar River Trail at Runway 16 to meet FAA D-III lateral RSA standards. While Airport Way is closed in Alternative 1A and requires traffic to be redirected to 2<sup>nd</sup> and 3<sup>rd</sup> streets, Alternative 1B relocates Airport Way to approximately the location of Tobin Street. The Perimeter Road is also relocated outside of the RSA/ROFA under Alternative 1B.

This alternative would require that the Airport acquire 52 parcels of land for safety area improvements, consisting of approximately 38.4 acres with a total assessed value of approximately \$46.1 Million; and 21 parcels of land for RPZ protection, consisting of approximately 11.7 acres valued at \$22.2 Million. Partial land acquisition of the Renton High School ball fields would be required for the RSA land acquisition. Alternative 1B also requires the acquisition of 8.4 acres of Lake Washington for safety area improvements.

Like Alternative 1A, Alternative 1B also relocates the parallel taxiways to standard 400-foot separation from the runway and requires that Airport Traffic Control Tower (ATCT) is relocated outside the TOFA, existing hangars within the TOFA are demolished or partially demolished, and existing 737 aircraft parking areas on the east side of the Airport are eliminated. The seaplane dock and pull out area would also be relocated. Alternative 1B is summarized in the following **Table D3 ALTERNATIVE 1B – TRADITIONAL GRADED RSA W/DECLARED DISTANCES SUMMARY**

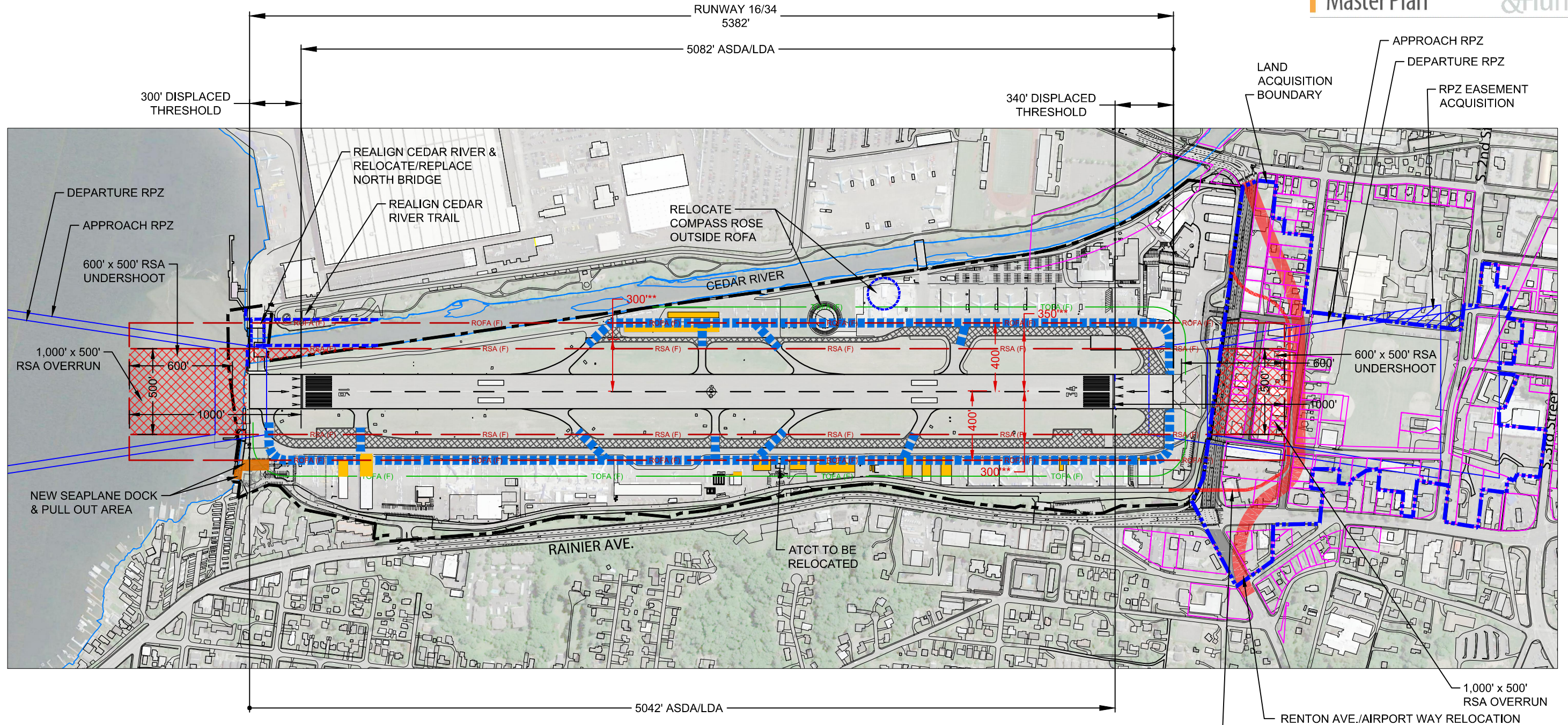
# Master Plan

Table D3 ALTERNATIVE 1B – TRADITIONAL GRADED RSA W/DECLARED DISTANCES SUMMARY

| Airfield Condition                       | Improvements Required to Meet RDC D-III Design Standards                                                                                                                                                                                                                                                                                                                                                                                                    |
|------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Runway 16/34 Location and Length</b>  | <ul style="list-style-type: none"> <li>No change - runway remains in existing location and displaced thresholds also remain in existing location.</li> </ul>                                                                                                                                                                                                                                                                                                |
| <b>Declared Distances</b>                | <ul style="list-style-type: none"> <li>All existing Declared Distances remain the same.</li> </ul>                                                                                                                                                                                                                                                                                                                                                          |
| <b>Runway Safety Area (RSA)</b>          |                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <i>RW 16 End</i>                         | <ul style="list-style-type: none"> <li>Traditional graded RSA is achieved by adding fill material into Lake Washington to construct a land mass approximately 500' wide x 700' long (8.4 acres);</li> <li>Cedar River and portion of Cedar River Trail Park are realigned; and</li> <li>North bridge is relocated/replaced (recently replaced in 2014).</li> </ul>                                                                                          |
| <i>RW 34 End</i>                         | <ul style="list-style-type: none"> <li>Traditional graded RSA is achieved by expanding Airport property boundary to the south to construct a traditional graded RSA approximately 500' wide x 925' long;</li> <li>Total property acquisition (for safety area improvements) is 52 parcels (38.4 acres with assessed value of \$46.1 M)<sup>1, 2</sup>; and</li> <li>Perimeter Rd. and Airport Way are relocated outside of the RSA/ROFA.</li> </ul>         |
| <b>Object Free Areas (ROFA and TOFA)</b> | <ul style="list-style-type: none"> <li>Hangars (or portions of hangars) penetrating ROFA and TOFA are demolished; and</li> <li>Parking spaces penetrating ROFA and TOFA are eliminated (including all Boeing parking spaces on Ramps A and B);</li> <li>ATCT is relocated outside TOFA; and</li> <li>Seaplane facility is relocated.</li> </ul>                                                                                                             |
| <b>Runway Protection Zone (RPZ)</b>      |                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <i>RW 16 End</i>                         | <ul style="list-style-type: none"> <li>Approach and departure RPZs remain in existing locations.</li> </ul>                                                                                                                                                                                                                                                                                                                                                 |
| <i>RW 34 End</i>                         | <ul style="list-style-type: none"> <li>Approach and departure RPZs remain in existing locations;</li> <li>Total property acquisition (for RPZ control) is 21 parcels (11.7 acres with assessed value of \$22.2M)<sup>1, 2</sup>;</li> <li>RPZ property acquisition and road closures eliminate some incompatible land uses, but relocated Airport Way (primary arterial) and Perimeter Road introduce new incompatible land uses within RPZ; and</li> </ul> |
| <b>Runway/Taxiway Separation</b>         | <ul style="list-style-type: none"> <li>Taxiway A is relocated, and centerline shifts 100' west for 400' runway centerline separation; and</li> <li>Taxiway B is relocated, and centerline shifts 100' east for 400' runway centerline separation.</li> </ul>                                                                                                                                                                                                |

NOTE: <sup>1</sup> Does not include City or Renton owned parcels.

<sup>2</sup> Land acquisition cost estimate is based on total assessed value in 2017 plus 20% contingency.



**LEGEND**

- EXISTING PROPERTY LINE
- FUTURE FUTURE PROPERTY LINE
- ROAD CLOSURE
- FUTURE ROADWAY ALIGNMENT
- FUTURE RUNWAY SAFETY AREA (RSA)
- FUTURE RUNWAY OBJECT FREE AREA (ROFA)
- FUTURE TAXIWAY OBJECT FREE AREA (TOFA)
- FUTURE TAXIWAY
- FUTURE RUNWAY SAFETY AREA EXPANSION
- TAXIWAY TO BE REMOVED
- FUTURE RPZ EASEMENT
- PROPOSED BUILDING/FACILITY DEMOLITION
- FUTURE SEAPLANE DOCK
- FUTURE ENGINEERED MATERIAL ARRESTING SYSTEM (EMAS)

**Disclaimer:**  
This illustration is for study purposes only, based on national FAA standards, and is not necessarily intended for implementation. For further information please see Chapter D of the Airport Master Plan and the FAQ document on the Airport's website.

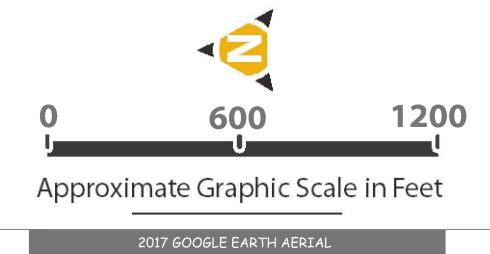


FIGURE D3 **Alternative 1B - Traditional Graded RSA with Declared Distances**

**COST ESTIMATE = \$170 M**

**Renton Municipal Airport/  
Clayton Scott Field**

# Master Plan

## Alternative 2 – Declared Distances w/South Shift

Alternative 2 proposes shifting the runway 1,300 feet to the south, and utilizes declared distances to maintain the takeoff runway length (shown as ASDA on the following illustration, **Figure D4**) and 4,750 feet of landing runway length (shown as LDA on the following illustration) in both directions. At the north end, there is a 1,200-foot displaced landing threshold, and at the south end there is a 332-foot displaced landing threshold. This alternative avoids development impacts to Lake Washington, but consequently, the associated development impacts, described below, are concentrated south of the Airport and would require significant costs for land acquisition and runway and RSA shift, and would result in disruptions to the community.

Unlike Alternatives 1A and 1B, Alternative 2 would not require realigning the Cedar River and Cedar River Trail or replacing the north bridge at Runway 16 to meet FAA D-III RSA standards because of the shift to the south. To meet FAA D-III RSA standards on the south end, Alternative 2 proposes tunneling approximately 900 feet of Airport Way, as it is not feasible to realign Airport Way in this alternative. Under this alternative, the Airport would need to acquire approximately 45 parcels of land, consisting of approximately 37.5 total acres with a total assessed value of \$44.3 Million, for safety area improvements. Partial land acquisition of the Renton High School ball fields would be required for these RSA improvements.

Under Alternative 2, both parallel taxiways (Taxiways A and B) are not relocated but rather are extended to the south, and connector taxiways to the future Runway 34 threshold are constructed. Under this alternative, runway/taxiway separation would be addressed with operational mitigation. Resultant of the southern shift of both the landing and takeoff thresholds, the approach and departure RPZs at Runway 34 must also shift south, which introduces additional incompatible land uses south of 2<sup>nd</sup> and 3<sup>rd</sup> Streets. The Airport would need RPZ easements for 48 parcels of land, consisting of approximately 31 acres at a cost of approximately \$5.3 Million. Alternative 2 is summarized in the following **Table D4 ALTERNATIVE 2 – DECLARED DISTANCES W/SOUTH SHIFT SUMMARY**.

# Master Plan

Table D4 ALTERNATIVE 2 – DECLARED DISTANCES W/SOUTH SHIFT SUMMARY

| Airfield Condition                       | Improvements Required to Meet RDC D-III Design Standards                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Runway 16/34 Location and Length</b>  | <ul style="list-style-type: none"> <li>Runway is shifted 1,300' to the south, airport property boundary is extended to the south and total runway length becomes 6,082';</li> <li>Displaced threshold at the north end increases to 1,200'; and</li> <li>Displaced threshold at the south end decreases slightly to 332'.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Declared Distances</b>                | <ul style="list-style-type: none"> <li>LDA remains 4,750' (both directions);</li> <li>RW 16 ASDA becomes 5,350'; and</li> <li>RW 34 ASDA becomes 5,082'.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Runway Safety Area (RSA)</b>          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <i>RW 16 End</i>                         | <ul style="list-style-type: none"> <li>Traditional graded RSA is achieved by 1,300' runway shift to the south;</li> <li>Existing seaplane dock is relocated outside of the RSA/ROFA;</li> <li>Requires no fill/property acquisition of Lake Washington;</li> <li>Requires no realignment of Cedar River or of Cedar River Trail Park; and</li> <li>Requires no replacement of North bridge</li> </ul>                                                                                                                                                                                                                                                                                                                                                      |
| <i>RW 34 End</i>                         | <ul style="list-style-type: none"> <li>Traditional graded RSA is achieved by shifting the runway and airport property boundary 1,300' to the south to construct a traditional graded RSA approximately 500' wide x 670' long; and</li> <li>Requires land acquisition of 45 parcels of land, consisting of approximately 37.5 total acres with a total assessed value of \$44.3 Million;<sup>1, 2</sup></li> <li>Renton High School ball field parcel is acquired, and facilities are relocated in accordance with the Uniform Act.;</li> <li>Airport Way (primary arterial) is tunneled under future airport property boundary;<sup>2</sup></li> <li>Perimeter Rd. is relocated;</li> <li>Portions of Tillicum St. and S. Tobin St. are closed.</li> </ul> |
| <b>Object Free Areas (ROFA and TOFA)</b> | <ul style="list-style-type: none"> <li>Hangars (or portions of hangars) penetrating ROFA and TOFA are demolished; and</li> <li>Parking spaces penetrating ROFA are eliminated; and</li> <li>Seaplane facility is relocated outside ROFA.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Runway Protection Zone (RPZ)</b>      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <i>RW 16 End</i>                         | <ul style="list-style-type: none"> <li>RPZs shift south 1,200'.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <i>RW 34 End</i>                         | <ul style="list-style-type: none"> <li>Approach/ departure RPZs are shifted 1,300' south in accordance with runway shift;</li> <li>RPZ easement acquisition of 48 parcels of land, consisting of approximately 31 acres at a cost of approximately \$5.3 Million;<sup>3, 4</sup> and</li> <li>RPZ shift introduces new incompatible land uses within RPZ and has the potential for significant community disruption since noise contours would also shift south.</li> </ul>                                                                                                                                                                                                                                                                                |
| <b>Runway/Taxiway Separation</b>         | <ul style="list-style-type: none"> <li>Requires operational mitigation.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

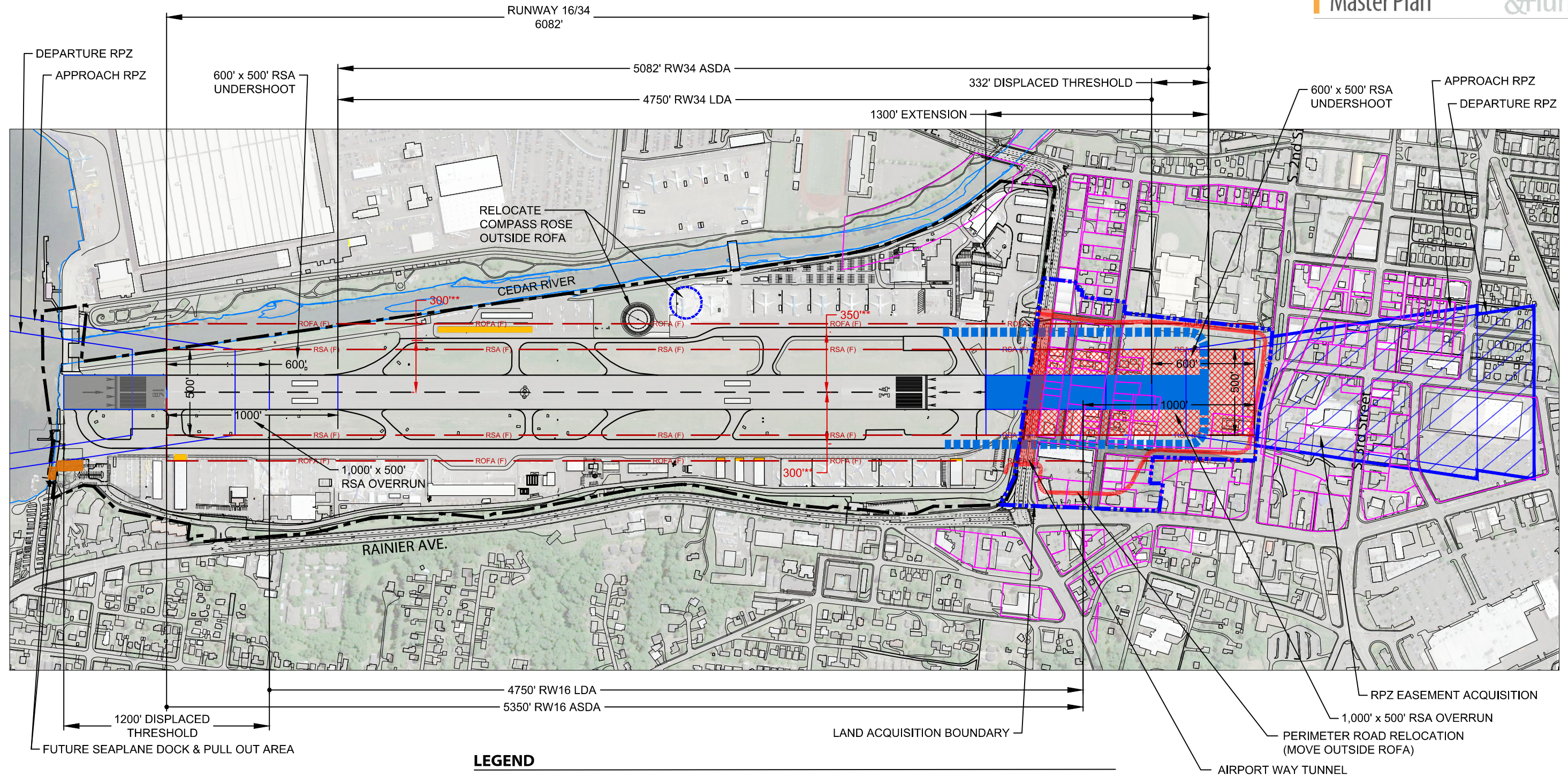
NOTE: <sup>1</sup> It isn't feasible to relocate Airport Way around the RSA in this alternative.

<sup>2</sup> Land acquisition cost estimate is based on total assessed value in 2017 plus 20% contingency.

<sup>3</sup> RPZ easement values account for 10% of total parcel value.

<sup>4</sup> City owned parcels not included in estimate.

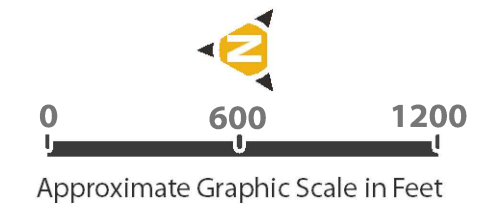




**Notes:**  
 \*\* RW/TW separation to be addressed with operational mitigation.

**Disclaimer:**  
 This illustration is for study purposes only, based on national FAA standards, and is not necessarily intended for implementation. For further information please see Chapter D of the Airport Master Plan and the FAQ document on the Airport's website.

| LEGEND |                                                    |
|--------|----------------------------------------------------|
|        | EXISTING PROPERTY LINE                             |
|        | FUTURE FUTURE PROPERTY LINE                        |
|        | ROAD CLOSURE                                       |
|        | FUTURE ROADWAY ALIGNMENT                           |
|        | FUTURE RUNWAY SAFETY AREA (RSA)                    |
|        | FUTURE RUNWAY OBJECT FREE AREA (ROFA)              |
|        | FUTURE TAXIWAY OBJECT FREE AREA (TOFA)             |
|        | FUTURE TAXIWAY                                     |
|        | FUTURE RUNWAY SAFETY AREA EXPANSION                |
|        | FUTURE PAVEMENT                                    |
|        | UNUSABLE RUNWAY PAVEMENT                           |
|        | FUTURE SEAPLANE DOCK                               |
|        | PROPOSED BUILDING/FACILITY DEMOLITION              |
|        | FUTURE RPZ EASEMENT                                |
|        | FUTURE ENGINEERED MATERIAL ARRESTING SYSTEM (EMAS) |



2017 GOOGLE EARTH AERIAL

FIGURE D4 **Alternative 2 - Declared Distances w/ South Shift**

**COST ESTIMATE = \$153 M**

**Renton Municipal Airport/  
Clayton Scott Field**

# Master Plan

## Alternative 3 – Declared Distances w/North Shift

Alternative 3 shifts the runway 660 feet north and utilizes declared distances to maintain the existing takeoff runway length (shown as ASDA on the following illustration, **Figure D5**) and landing runway length (shown as LDA on the following illustration). This alternative requires extending Taxiway A and constructing a new connector taxiway to the future Runway 16.

To meet FAA D-III RSA design standards, Alternative 3 places approximately 11.7 acres of fill into Lake Washington to support full strength runway and taxiway pavement. Like other alternatives, Alternative 3 would require realigning the Cedar River and Cedar River Trail at Runway 16 to meet the lateral requirements for FAA D-III RSA standards.

Alternative 3 avoids the community impacts associated with expanding the airport property boundary to the south, as proposed in Alternatives 1A, 1B, and 2. However, Alternative 3 requires that the Airport acquire 11.7 acres of property (fee simple or easement) for construction purposes in Lake Washington.

To meet D-III ROFA design standards, Alternative 3 proposes relocating the seaplane pull out ramp and dock to the south and west of the new Runway 16 end. In accordance with the northern shift of both the landing and takeoff thresholds, the approach and departure RPZs shift north; however, the northern RPZs are located entirely over Lake Washington, and therefore don't encompass any incompatible land uses. There would be 52 parcels within the shifted RPZ, consisting of approximately 45 acres with an easement estimate of \$10.4 Million.

Taxiway A is extended to 660 feet north to the end of Runway 16 and a new taxiway connector would be constructed. This alternative addresses runway/taxiway separation with operational mitigation. Alternative 3 is summarized in the following table, **Table D5 ALTERNATIVE 3 – DECLARED DISTANCES W/NORTH SHIFT SUMMARY**.

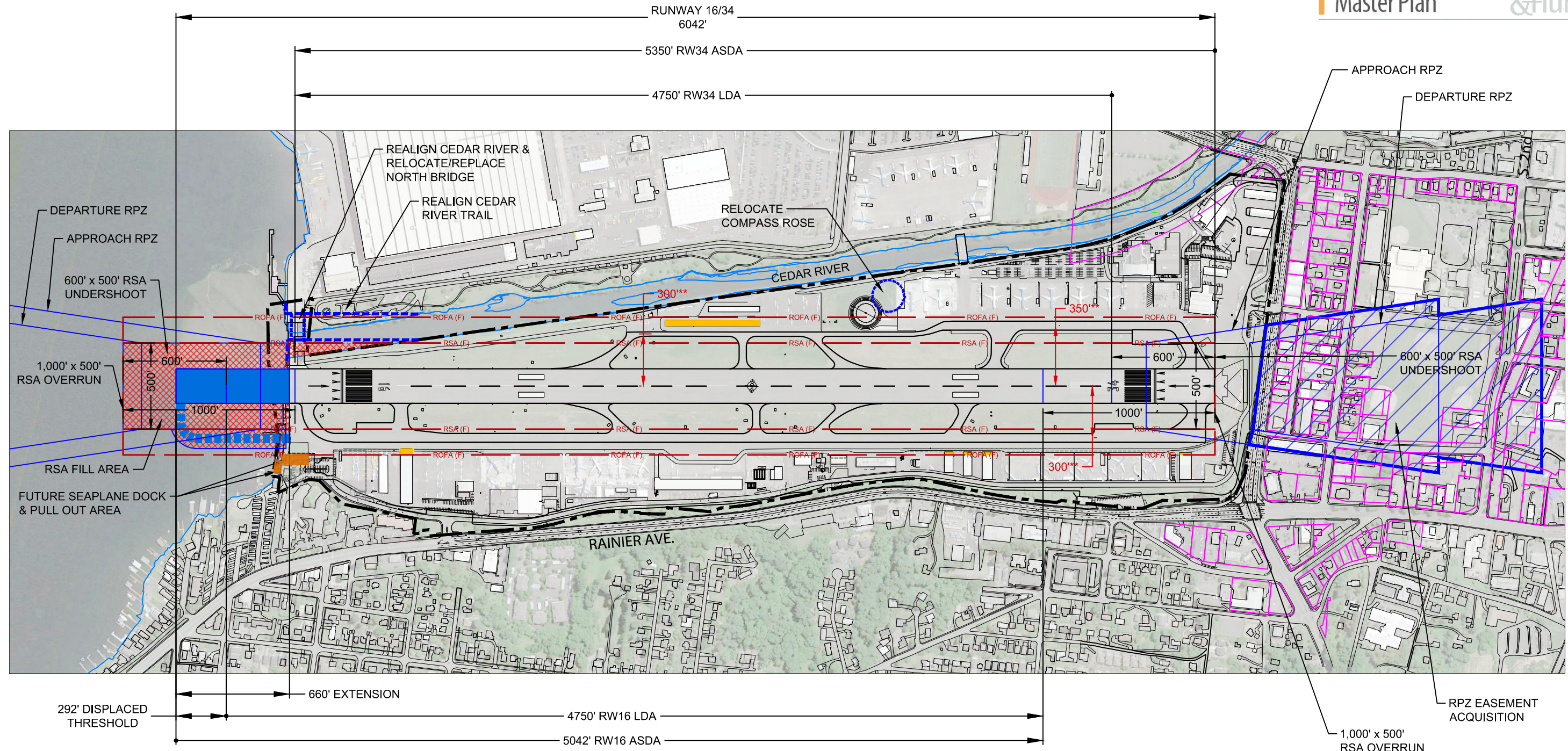
# Master Plan

Table D5 ALTERNATIVE 3 – DECLARED DISTANCES W/NORTH SHIFT SUMMARY

| Airfield Condition                       | Improvements Required to Meet RDC D-III Design Standards                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Runway 16/34 Location and Length</b>  | <ul style="list-style-type: none"> <li>Runway 16/34 is shifted approximately 660' north; and</li> <li>Total runway length becomes 6,042'.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Declared Distances</b>                | <ul style="list-style-type: none"> <li>LDA in both directions decreases to 5,042';</li> <li>Runway 16 ASDA becomes 5,042';</li> <li>Runway 16 ASDA becomes 5,350';</li> <li>Runway 16 displaced threshold decreases slightly from 300' to 292'; and</li> <li>Runway 34 displaced threshold increases from 340' to 600';</li> </ul>                                                                                                                                                                                             |
| <b>Runway Safety Area (RSA)</b>          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <i>RW 16 End</i>                         | <ul style="list-style-type: none"> <li>RSA is achieved by adding fill material into Lake Washington to construct a land mass approximately 500' wide x 952' long;</li> <li>Requires 11.7 acres of property (fee simple or easement) for construction purposes in Lake Washington;</li> <li>Existing seaplane pullout and dock is relocated outside RSA/ROFA;</li> <li>Cedar River and portion of Cedar River Trail Park are realigned; and</li> <li>North bridge is relocated/replaced (recently replaced in 2014).</li> </ul> |
| <i>RW 34 End</i>                         | <ul style="list-style-type: none"> <li>Traditional graded RSA is achieved by utilizing existing graded area at south in tandem with the runway shift to the north; and</li> <li>No land acquisitions required.</li> </ul>                                                                                                                                                                                                                                                                                                      |
| <b>Object Free Areas (ROFA and TOFA)</b> | <ul style="list-style-type: none"> <li>Hangars (or portions of hangars) penetrating ROFA are demolished</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Runway Protection Zone (RPZ)</b>      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <i>RW 16 End</i>                         | <ul style="list-style-type: none"> <li>Approach and departure RPZs shift north with runway shift (they are over Lake Washington so there are no incompatible land uses).</li> </ul>                                                                                                                                                                                                                                                                                                                                            |
| <i>RW 34 End</i>                         | <ul style="list-style-type: none"> <li>Approach and departure RPZs shift north with runway shift; and</li> <li>RPZ easement acquisition of 52 parcels (approximately 45 acres with assessed value of \$10.4 M)<sup>1, 2</sup>; and</li> <li>Requires no road closures or relocations.</li> </ul>                                                                                                                                                                                                                               |
| <b>Runway/Taxiway Separation</b>         | <ul style="list-style-type: none"> <li>Requires operational mitigation.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                             |

NOTE: <sup>1</sup> City owned parcels not included in estimate.

<sup>2</sup> RPZ easement values account for 10% of total parcel value.

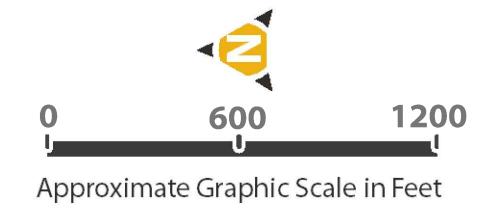


**Notes:**  
 \*\* RW/TW separation to be addressed with operational mitigation.

**Disclaimer:**  
 This illustration is for study purposes only, based on national FAA standards, and is not necessarily intended for implementation. For further information please see Chapter D of the Airport Master Plan and the FAQ document on the Airport's website.

**LEGEND**

- EXISTING PROPERTY LINE
- FUTURE ROADWAY ALIGNMENT
- FUTURE RUNWAY SAFETY AREA (RSA)
- FUTURE RUNWAY OBJECT FREE AREA (ROFA)
- FUTURE TAXIWAY OBJECT FREE AREA (TOFA)
- FUTURE TAXIWAY
- FUTURE RUNWAY SAFETY AREA EXPANSION
- FUTURE PAVEMENT
- FUTURE SEAPLANE DOCK
- PROPOSED BUILDING/FACILITY DEMOLITION
- FUTURE RPZ EASEMENT
- FUTURE ENGINEERED MATERIAL ARRESTING SYSTEM (EMAS)



2017 GOOGLE EARTH AERIAL

FIGURE D5 **Alternative 3 - Declared Distances w/ North Shift**

**COST ESTIMATE = \$82 M**

**Renton Municipal Airport/  
Clayton Scott Field**

# Master Plan

## Alternative 4 – Declared Distances and EMAS w/South Shift

Alternative 4, shown in **Figure D6**, is similar to the concept presented in Alternative 2, as it proposes a runway shift to the south and it utilizes declared distances; however, Alternative 4 proposes constructing EMAS beds (350 feet long by 200 feet wide) at each runway end to reduce the amount of land necessary to meet FAA D-III RSA design standards. Also, in Alternative 4, the runway shift to the south is reduced to 400 feet. At the north end (Runway end 16), the EMAS bed must be located to maintain access from the Boeing north bridge to Taxiway A. Like other alternatives, Alternative 4 would require realigning the Cedar River and Cedar River Trail at Runway 16 to meet FAA D-III RSA standards. At the south end of the runway, the shift and EMAS bed placement require relocating Perimeter Road and Airport Way outside of the RSA/ROFA. This alternative requires extending both parallel Taxiways A and B to the south, at Runway end 34, consequently shifting the Runway 34 approach and departure RPZs to the south, which introduces more incompatible land uses.

Alternative 4 avoids impacts to Lake Washington to the north, as it does not require placing fill into Lake Washington. However, it results in greater impacts on the south side of the Airport, as it requires that the Airport acquire approximately 43 parcels of land, consisting of 35.2 total acres with a total assessed value of \$39.3 Million. Also at the south end, the RPZ easements for 33 parcels consisting of 14.7 acres are estimated to be approximately \$3.6 Million.

This alternative requires that Taxiway A is extended to the new runway ends in both directions and new connectors are constructed at both runway ends, and also requires an extension of Taxiway B to the south end of the runway (Runway 34 end) and construction of a new taxiway connector. Under this alternative, runway/taxiway separation would be addressed with operational mitigation. Alternative 4 is summarized in the following table, **Table D6 ALTERNATIVE 4 – DECLARED DISTANCES AND EMAS W/SOUTH SHIFT SUMMARY**.

# Master Plan

Table D6 ALTERNATIVE 4 – DECLARED DISTANCES AND EMAS W/SOUTH SHIFT SUMMARY

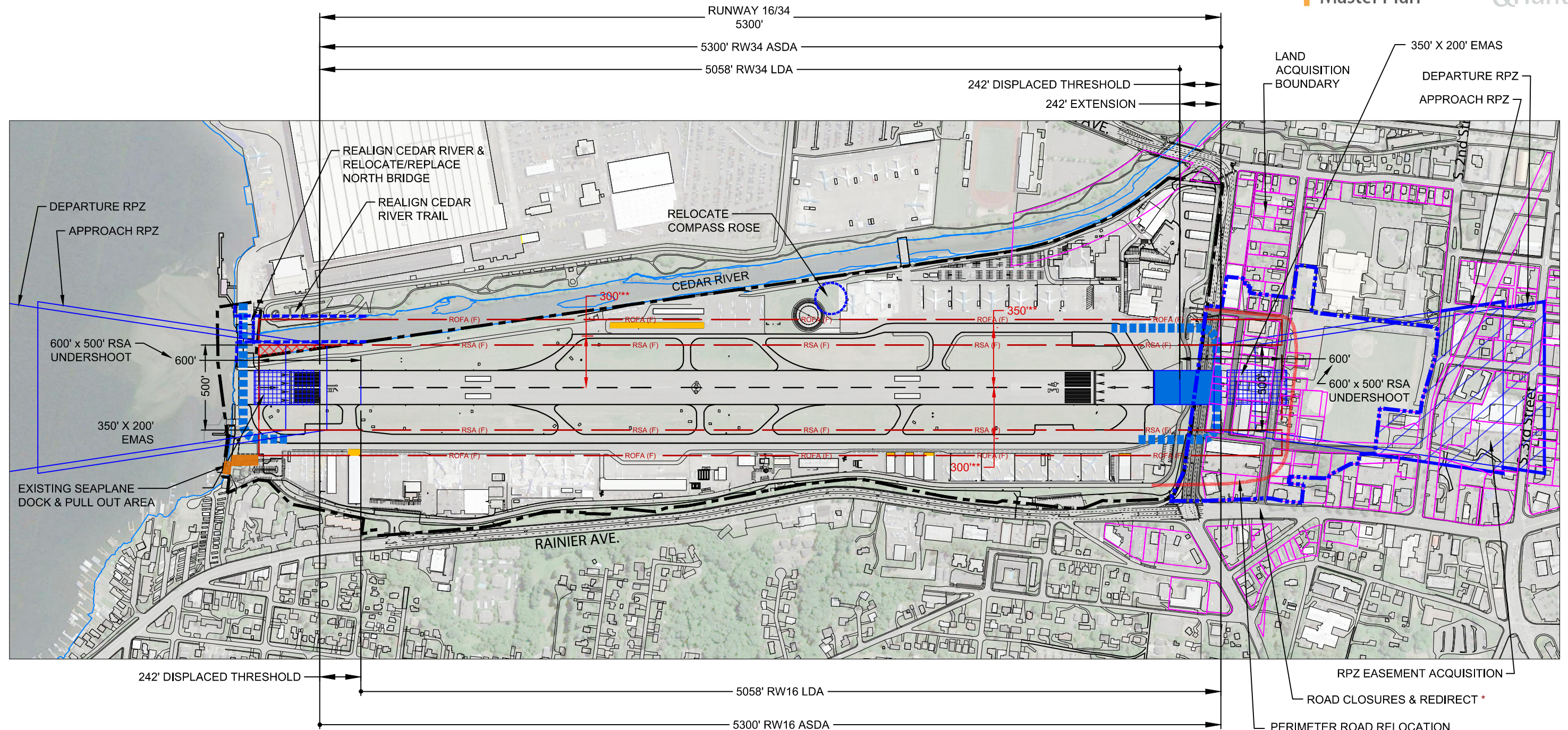
| Airfield Condition                       | Improvements Required to Meet RDC D-III Design Standards                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Runway 16/34 Location and Length</b>  | <ul style="list-style-type: none"> <li>Runway 16/34 is extended approximately 400' south; and</li> <li>Total runway length becomes 5,300'.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Declared Distances</b>                | <ul style="list-style-type: none"> <li>LDA decreases to 5,058' in both directions;</li> <li>ASDA becomes 5,300' in both directions;</li> <li>Displaced threshold at south end decreases from 340' to 242'; and</li> <li>Displaced threshold at north end decreases slightly from 300' to 242'.</li> </ul>                                                                                                                                                                                                                                                                             |
| <b>Runway Safety Area (RSA)</b>          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <i>RW 16 End</i>                         | <ul style="list-style-type: none"> <li>350' x 200' EMAS bed is constructed;</li> <li>Seaplane pull out and dock are relocated;</li> <li>Cedar River and portion of Cedar River Trail Park are realigned; and</li> <li>North bridge is relocated/replaced (recently replaced in 2014).</li> </ul>                                                                                                                                                                                                                                                                                      |
| <i>RW 34 End</i>                         | <ul style="list-style-type: none"> <li>Airport property boundary extends to the south to allow for the runway shift;</li> <li>350' x 200' EMAS bed is constructed;</li> <li>Perimeter Rd. is relocated outside of the RSA and Airport Way (primary arterial) is closed (traffic is redirected to 2<sup>nd</sup> and 3<sup>rd</sup> Streets);</li> <li>Portions of S. Tillicum, and S. Tobin Streets are closed; and</li> <li>Land Acquisitions: 43 parcels (approximately 35.2 acres valued at \$39.3 M) are required for RSA and road relocations/closures.<sup>1,2</sup></li> </ul> |
| <b>Object Free Areas (ROFA and TOFA)</b> | <ul style="list-style-type: none"> <li>Hangars (or portions of hangars) penetrating ROFA are demolished.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Runway Protection Zone (RPZ)</b>      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <i>RW 16 End</i>                         | <ul style="list-style-type: none"> <li>Approach and departure RPZs shift south with runway shift (they are over Lake Washington and Airport property so there are no incompatible land uses).</li> </ul>                                                                                                                                                                                                                                                                                                                                                                              |
| <i>RW 34 End</i>                         | <ul style="list-style-type: none"> <li>Approach and departure RPZs shift south with runway shift, which introduces new incompatible land uses in RPZ; and</li> <li>RPZ easement acquisition of 33 parcels (approximately 14.7 acres with assessed value of \$3.6 M).<sup>3,4</sup></li> </ul>                                                                                                                                                                                                                                                                                         |
| <b>Runway/Taxiway Separation</b>         | <ul style="list-style-type: none"> <li>Requires operational mitigation.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

NOTE: <sup>1</sup> Assessed Total Value for Renton High School parcel is 50% of land value.

<sup>2</sup> Land acquisition cost estimate is based on total assessed value in 2017 plus 20% contingency.

<sup>3</sup> City owned parcels not included in estimate.

<sup>4</sup> RPZ easement values account for 10% of total parcel value.

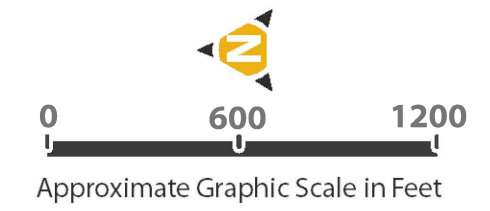


**Notes:**  
 \* Airport Way and portions of Tilicum St., Tobin St. & Lake Ave. to be closed. Airport Way traffic between Renton Ave. and Logan Ave. would be redirected to 2nd & 3rd streets.  
 \*\* RW/TW separation to be addressed with operational mitigation.

**Disclaimer:**  
 This illustration is for study purposes only, based on national FAA standards, and is not necessarily intended for implementation. For further information please see Chapter D of the Airport Master Plan and the FAQ document on the Airport's website.

**LEGEND**

- EXISTING PROPERTY LINE
- FUTURE FUTURE PROPERTY LINE
- ROAD CLOSURE
- FUTURE ROADWAY ALIGNMENT
- FUTURE RUNWAY SAFETY AREA (RSA)
- FUTURE RUNWAY OBJECT FREE AREA (ROFA)
- FUTURE TAXIWAY OBJECT FREE AREA (TOFA)
- FUTURE TAXIWAY
- FUTURE RUNWAY SAFETY AREA EXPANSION
- FUTURE PAVEMENT
- FUTURE SEAPLANE DOCK
- PROPOSED BUILDING/FACILITY DEMOLITION
- FUTURE RPZ EASEMENT
- FUTURE ENGINEERED MATERIAL ARRESTING SYSTEM (EMAS)



2017 GOOGLE EARTH AERIAL

FIGURE D6 **Alternative 4 - Declared Distances and EMAS w/ South Shift**

**COST ESTIMATE = \$90 M**

**Renton Municipal Airport/  
Clayton Scott Field**

# Master Plan

## Alternative 5 – Declared Distances and EMAS w/North Shift

Like Alternative 4, Alternative 5 also proposes constructing EMAS beds at each end of the runway to meet FAA D-III RSA standards. However, under Alternative 5, the runway shifts 122 feet to the north and the EMAS bed in Lake Washington is constructed on a deck (or pillars), while the EMAS bed at the south end is constructed on existing airport pavement, as shown in **Figure D7**. Like Alternative 4, the EMAS bed at the north end must be located to maintain access from the Boeing north bridge to Taxiway A. Alternative 5 utilizes declared distances and requires a 227-foot displaced threshold at both runway ends, a 122 feet runway extension into Lake Washington at Runway 16. This alternative provides 5,300' of takeoff length (shown as Accelerate Stop Distance or ASDA on the following illustration) and 5,073 feet of landing runway length (shown as Landing Distance Available or LDA on the following illustration) for Runway 16/34.

Like the other alternatives, Alternative 5 would require realigning the Cedar River and Cedar River Trail at Runway 16 to meet lateral FAA D-III RSA standards. Like Alternative 3, Alternative 5 does not require relocating any public roadways at the south end of the Airport. Only a small portion of Perimeter Road would require realignment outside of the ROFA. Alternative 5 avoids community impacts to the south, in that it doesn't require land acquisition of residences and businesses to the south, and it doesn't require relocating or closing of public roads, so there would be no traffic impacts. However, this alternative does require the acquisition of 6.6 acres of Lake Washington.

Under Alternative 5, the Taxiway A & B connectors at Runway 34 are removed; and new connector taxiways to the Runway 34 threshold are constructed at the relocated displaced threshold. Under this alternative, runway/taxiway separation would be addressed with operational mitigation. The RPZ easement estimate for 44 parcels, consisting of 40.4 acres, is approximately \$9 Million. Alternative 5 is summarized in the following table, **Table D7 ALTERNATIVE 5 – EMAS W/NORTH SHIFT SUMMARY**.



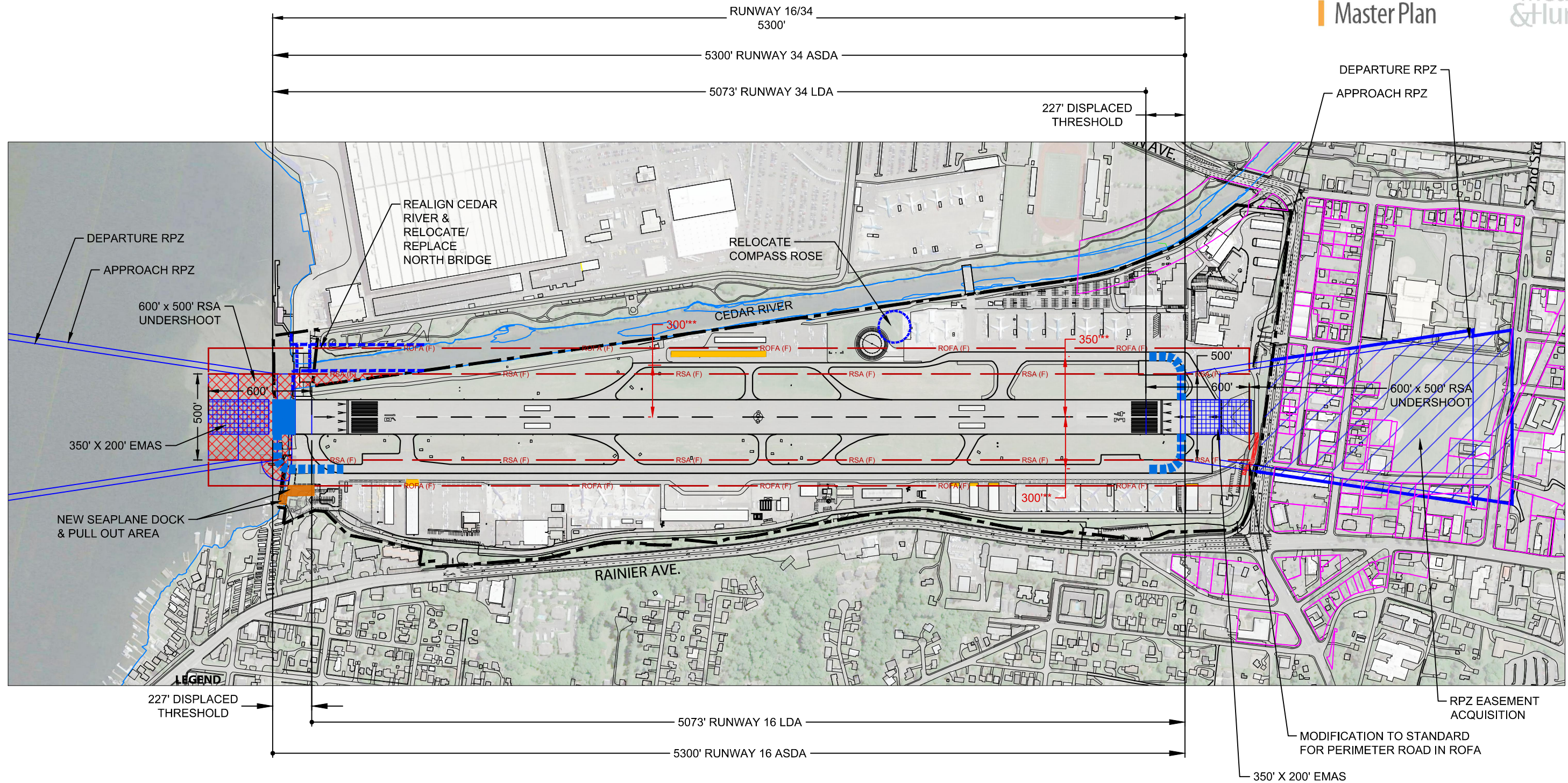
# Master Plan

Table D7 ALTERNATIVE 5 – DECLARED DISTANCES AND EMAS W/NORTH SHIFT SUMMARY

| Airfield Condition                       | Improvements Required to Meet RDC D-III Design Standards                                                                                                                                                                                                                                                                                                                                                   |
|------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Runway 16/34 Location and Length</b>  | <ul style="list-style-type: none"> <li>Runway 16/34 is extended approximately 122' north; and</li> <li>Total runway length becomes 5,300'.</li> </ul>                                                                                                                                                                                                                                                      |
| <b>Declared Distances</b>                | <ul style="list-style-type: none"> <li>LDA increases to 5,073' in both directions;</li> <li>ASDA becomes 5,300' in both directions;</li> <li>Displaced threshold at south end decreases from 340' to 227'; and</li> <li>Displaced threshold at north end decreases from 300' to 227'.</li> </ul>                                                                                                           |
| <b>Runway Safety Area (RSA)</b>          |                                                                                                                                                                                                                                                                                                                                                                                                            |
| <i>RW 16 End</i>                         | <ul style="list-style-type: none"> <li>350' x 200' EMAS bed is constructed;</li> <li>Requires 6.6 acres of property (fee simple or easement) for construction purposes in Lake Washington;</li> <li>Seaplane pullout and dock relocated;</li> <li>Cedar River and portion of Cedar River Trail Park are realigned; and</li> <li>North bridge is relocated/replaced (recently replaced in 2014).</li> </ul> |
| <i>RW 34 End</i>                         | <ul style="list-style-type: none"> <li>350' x 200' EMAS bed is constructed;</li> <li>Small segment of Perimeter Rd. is relocated outside of the RSA</li> <li>Airport Way (primary arterial) is not impacted; and</li> <li>No land acquisition required for RSA.</li> </ul>                                                                                                                                 |
| <b>Object Free Areas (ROFA and TOFA)</b> | <ul style="list-style-type: none"> <li>Hangars (or portions of hangars) penetrating ROFA are demolished.</li> </ul>                                                                                                                                                                                                                                                                                        |
| <b>Runway Protection Zone (RPZ)</b>      |                                                                                                                                                                                                                                                                                                                                                                                                            |
| <i>RW 16 End</i>                         | <ul style="list-style-type: none"> <li>Approach and departure RPZs shift north with runway shift (they are over Lake Washington so there are no incompatible land uses).</li> </ul>                                                                                                                                                                                                                        |
| <i>RW 34 End</i>                         | <ul style="list-style-type: none"> <li>Approach and departure RPZs shift north with runway shift; however, the RPZ's still contain incompatible land uses; and</li> <li>RPZ easement acquisitions of 44 parcels (approximately 40.4 acres with assessed value of \$9.0M).<sup>1, 2</sup></li> </ul>                                                                                                        |
| <b>Runway/Taxiway Separation</b>         | <ul style="list-style-type: none"> <li>Requires operational mitigation.</li> </ul>                                                                                                                                                                                                                                                                                                                         |

NOTE: <sup>1</sup> City owned parcels not included in estimate.

<sup>2</sup> RPZ easement values account for 10% of total parcel value.

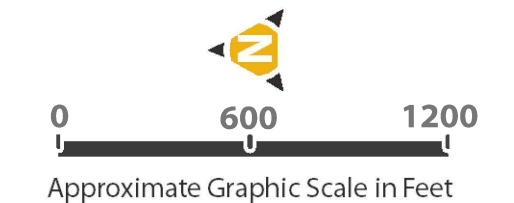


**Notes:**  
 \*\* RW/TW separation to be addressed with operational mitigation.

**Disclaimer:**  
 This illustration is for study purposes only, based on national FAA standards, and is not necessarily intended for implementation. For further information please see Chapter D of the Airport Master Plan and the FAQ document on the Airport's website.

**LEGEND**

- EXISTING PROPERTY LINE
- ROAD CLOSURE
- FUTURE ROADWAY ALIGNMENT
- FUTURE RUNWAY SAFETY AREA (RSA)
- FUTURE RUNWAY OBJECT FREE AREA (ROFA)
- FUTURE TAXIWAY OBJECT FREE AREA (TOFA)
- FUTURE TAXIWAY
- FUTURE RUNWAY SAFETY AREA EXPANSION
- FUTURE PAVEMENT
- FUTURE SEAPLANE DOCK
- PROPOSED BUILDING/FACILITY DEMOLITION
- FUTURE RPZ EASEMENT
- FUTURE ENGINEERED MATERIAL ARRESTING SYSTEM (EMAS)



2017 GOOGLE EARTH AERIAL

FIGURE D7 **Alternative 5 - Declared Distances and EMAS w/ North Shift**

**COST ESTIMATE = \$71 M**

**Renton Municipal Airport/  
 Clayton Scott Field**

# Master Plan

## Alternative 6 – Declared Distances w/EMAS North and Traditional Graded RSA South

Alternative 6 was developed following a 2015 meeting with the Renton Airport Advisory Committee (RAAC), where the initial set of alternatives was presented to the RAAC. The idea behind Alternative 6 was to utilize EMAS at the north end and graded RSA at the south end, essentially sharing the impacts equally between the north and south ends of the Airport as illustrated in **Figure D8**. The EMAS at the north end is approximately 200-feet-wide by 350-feet-long and would be placed on either land fill or a deck on pillars. Like Alternatives 4 and 5, the EMAS bed at the north end of the runway must be located to maintain access from the Boeing north bridge to Taxiway A. Alternative 6 would also require realigning the Cedar River and Cedar River Trail at Runway 16 to meet lateral FAA D-III RSA standards. This alternative requires the acquisition of 4.6 acres within Lake Washington. To achieve the traditional graded safety area at the south end, Alternative 6 extends the airport boundary to the south and requires land acquisition of 67 parcels (approximately 42 acres valued at \$51.8 Million). Alternative 6 would also relocate Airport Way to approximately Tobin Street.

Alternative 6 utilizes declared distances and requires a 227-foot displaced threshold at the north end, which provides a takeoff length (shown as ASDA on the following illustration) of 5,382 feet of landing runway length (shown as LDA on the following illustration) for Runway 34. At the south end, Alternative 6 requires a 343-foot displaced threshold, and provides a takeoff length (shown as ASDA on the following illustration) of 5,039 feet and 4,812 feet of landing runway length (shown as LDA on the following illustration) for Runway 16.

This alternative does not require an extension of either Taxiway and like Alternatives 2, 3, 4 and 5, runway/taxiway separation would be addressed with operational mitigation.

Under Alternative 6, improvements are proposed at both runway ends, resulting in impacts that are more balanced between the community and the environment, as opposed to other alternatives, in which impacts are disproportionately distributed between the community and the environment. Alternative 6 is summarized in the following table, **Table D8 ALTERNATIVE 6 – DECLARED DISTANCES W/EMAS NORTH AND TRADITIONAL GRADED RSA SOUTH SUMMARY**.

# Master Plan

Table D8 ALTERNATIVE 6 – DECLARED DISTANCES W/EMAS NORTH AND TRADITIONAL GRADED RSA SOUTH SUMMARY

| Airfield Condition                       | Improvements Required to Meet RDC D-III Design Standards                                                                                                                                                                                                                                                                                                                                                                               |
|------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Runway 16/34 Location and Length</b>  | <ul style="list-style-type: none"> <li>Runway 16/34 would be maintained in its existing configuration; and</li> <li>Total runway length is 5,382’.</li> </ul>                                                                                                                                                                                                                                                                          |
| <b>Declared Distances</b>                | <ul style="list-style-type: none"> <li>Displaced threshold at north end decreases from 300’ to 227’;</li> <li>Displaced threshold at south end increases from 340’ to 343’;</li> <li>Runway 16 has 5,039’ LDA, and 5,382’ ASDA; and</li> <li>Runway 34 has 4,812’ LDA and 5,039’ ASDA.</li> </ul>                                                                                                                                      |
| <b>Runway Safety Area (RSA)</b>          |                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <i>RW 16 End</i>                         | <ul style="list-style-type: none"> <li>350’ x 200’ EMAS bed is constructed;</li> <li>Requires 4.6 acres of property (fee simple or easement) for construction purposes in Lake Washington;</li> <li>Cedar River and portion of Cedar River Trail Park are realigned; and</li> <li>North bridge is relocated/replaced (recently replaced in 2014).</li> </ul>                                                                           |
| <i>RW 34 End</i>                         | <ul style="list-style-type: none"> <li>Airport property boundary is extended to the south to construct a traditional graded RSA that is 500’ wide x 450’ long;</li> <li>Airport Way (primary arterial) and Perimeter Rd. are relocated outside of the RSA/ROFA; and</li> <li>Land acquisition of 67 parcels (approximately 42.0 acres valued at \$51.8 Million) required for graded RSA and road relocations.<sup>1,2</sup></li> </ul> |
| <b>Object Free Areas (ROFA and TOFA)</b> | <ul style="list-style-type: none"> <li>Hangars (or portions of hangars) penetrating ROFA are demolished; and</li> <li>The existing seaplane pull out and dock is relocated outside of the ROFA.</li> </ul>                                                                                                                                                                                                                             |
| <b>Runway Protection Zone (RPZ)</b>      |                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <i>RW 16 End</i>                         | <ul style="list-style-type: none"> <li>Approach and departure RPZs shift north with runway shift (they are over Lake Washington so there are no incompatible land uses).</li> </ul>                                                                                                                                                                                                                                                    |
| <i>RW 34 End</i>                         | <ul style="list-style-type: none"> <li>Approach and departure RPZs shift north with runway shift, which eliminates a small area of incompatible land uses within the existing RPZs; and</li> <li>RPZ easement acquisitions of 8 parcels including the High School ball fields (approximately 40.4 acres with assessed value of \$1.3 Million).<sup>3,4,5</sup></li> </ul>                                                              |
| <b>Runway/Taxiway Separation</b>         | <ul style="list-style-type: none"> <li>Requires operational mitigation.</li> </ul>                                                                                                                                                                                                                                                                                                                                                     |

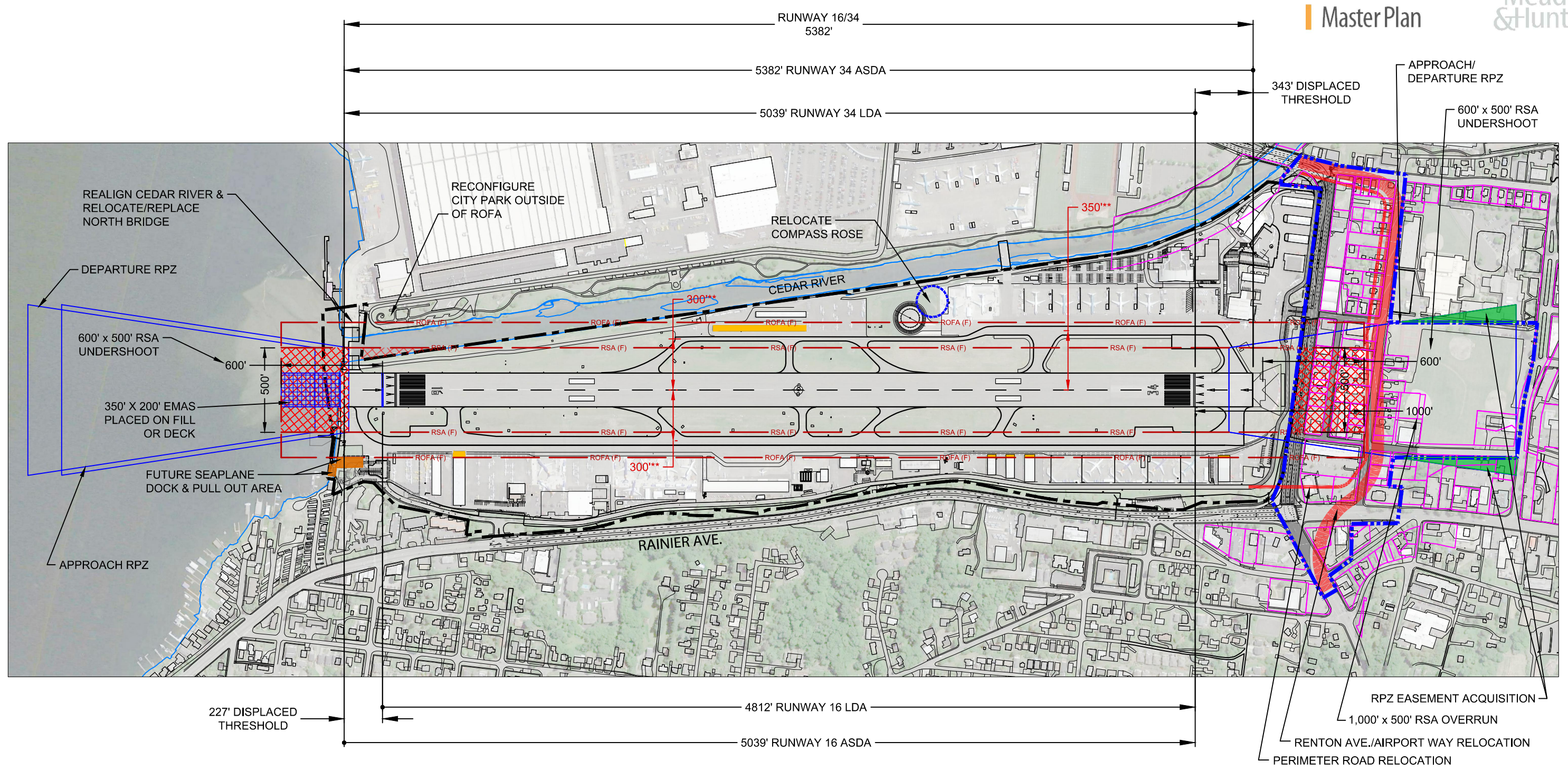
NOTE: <sup>1</sup> Assessed Total Value for Renton High School parcel is 50% of land value.

<sup>2</sup> Land acquisition cost estimate is based on total assessed value in 2017 plus 20% contingency.

<sup>3</sup> City owned parcels not included in estimate.

<sup>4</sup> RPZ easement values account for 10% of total parcel value.

<sup>5</sup> Easement estimate the portion of Renton High School parcel in controlled activity area is 10% of the land value of 50% of the parcel.



**Notes:**  
 \*Existing land uses in controlled activity area to remain.  
 \*\*RW/TW separation to be addressed with operational mitigation.

**Disclaimer:**  
 This illustration is for study purposes only, based on national FAA standards, and is not necessarily intended for implementation. For further information please see Chapter D of the Airport Master Plan and the FAQ document on the Airport's website.

| LEGEND |                                       |  |                                                    |
|--------|---------------------------------------|--|----------------------------------------------------|
|        | EXISTING PROPERTY LINE                |  | FUTURE RSA EXPANSION                               |
|        | FUTURE FUTURE PROPERTY LINE           |  | FUTURE SEAPLANE DOCK                               |
|        | ROAD CLOSURE                          |  | RPZ CONTROLLED ACTIVITY AREA (EASEMENT)*           |
|        | FUTURE ROADWAY ALIGNMENT              |  | PROPOSED BUILDING/FACILITY DEMOLITION              |
|        | FUTURE RUNWAY SAFETY AREA (RSA)       |  | FUTURE RPZ EASEMENT                                |
|        | FUTURE RUNWAY OBJECT FREE AREA (ROFA) |  | FUTURE ENGINEERED MATERIAL ARRESTING SYSTEM (EMAS) |

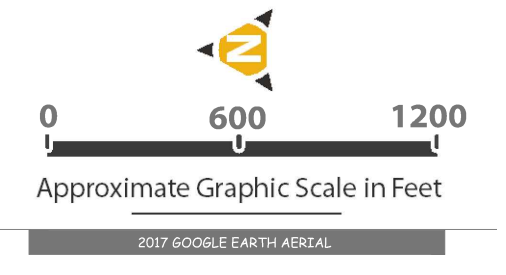


FIGURE D8 **Alternative 6 - Declared Distances with EMAS North and Traditional Graded RSA South**

**COST ESTIMATE = \$118 M**

**Renton Municipal Airport/  
Clayton Scott Field**

# Master Plan

## Airfield Alternatives Cost Comparison

Planning level cost estimates were completed for each of the comprehensive airfield alternatives that were developed. For comparison purposes, these estimates are summarized in the following table entitled Table D9, **COMPREHENSIVE AIRFIELD ALTERNATIVES COST ESTIMATES**. It is important to note that these cost estimates include only what is necessary to construct each alternative to meet FAA D-III design standards for runway length, safety areas, runway-taxiway separation, and RPZ land acquisition or easement costs pertaining to FAA guidance on land use compatibility within the RPZ. Other improvements (i.e., corrections to other non-standard conditions, future landside development, etc.) will be analyzed in the following section of this chapter (Landside Alternatives Analysis) once a preferred airfield alternative has been selected.



# Master Plan

Table D9, COMPREHENSIVE AIRFIELD ALTERNATIVES COST ESTIMATES

| Cost Estimate                                  | Alternative 1A – Traditional Graded RSA w/out declared distances | Alternative 1B – Traditional Graded RSA w/declared distances | Alternative 2 – Declared Distances w/South Shift | Alternative 3 – Declared Distances w/North Shift* | Alternative 4 – EMAS w/South Shift | Alternative 5 – EMAS w/North Shift* | Alternative 6 – Declared Distances w/EMAS North and Traditional Graded RSA South |
|------------------------------------------------|------------------------------------------------------------------|--------------------------------------------------------------|--------------------------------------------------|---------------------------------------------------|------------------------------------|-------------------------------------|----------------------------------------------------------------------------------|
| RSA Improvements <sup>1</sup>                  | \$84,986,550                                                     | \$72,084,600                                                 | \$102,274,650                                    | \$69,986,700                                      | \$44,586,450                       | \$60,469,200                        | \$63,737,550                                                                     |
| Misc. Airfield Improvements <sup>1</sup>       | \$30,102,300                                                     | \$30,102,300                                                 | \$1,254,150                                      | \$1,254,150                                       | \$1,254,150                        | \$1,254,150                         | \$1,254,150                                                                      |
| Land Acquisition (Safety Area) <sup>2, 3</sup> | \$43,195,500                                                     | \$46,104,780                                                 | \$44,307,780                                     | \$0                                               | \$39,296,100                       | \$0                                 | \$51,812,580                                                                     |
| Land Acquisition (RPZ Control) <sup>2, 3</sup> | \$17,993,880.0                                                   | \$22,162,560.0                                               | \$0                                              | \$0                                               | \$128,136.0                        | \$0                                 | \$0                                                                              |
| RPZ Easements <sup>3, 4</sup>                  | \$0                                                              | \$0                                                          | \$5,339,490                                      | \$10,430,810                                      | \$4,298,616                        | \$8,990,900                         | \$1,308,615                                                                      |
| <b>TOTAL</b>                                   | <b>\$176,278,230</b>                                             | <b>\$170,454,240</b>                                         | <b>\$153,176,070</b>                             | <b>\$81,671,660</b>                               | <b>\$89,563,452</b>                | <b>\$70,714,250</b>                 | <b>\$118,112,895</b>                                                             |

SOURCE: Mead & Hunt; Land value appraisal information was obtained from King County Assessor (12/20/2017). All costs in 2018 dollars.

NOTES: <sup>1</sup> Construction cost estimates include a 10% mobilization cost and a 25% contingency cost.

<sup>2</sup> Land acquisition cost estimates are based on total assessed value in 2017 plus 20% contingency.

<sup>3</sup> City owned parcels not included in estimate.

<sup>4</sup> RPZ easement values account for 10% of total parcel value.

<sup>5</sup> Alternatives 1A and 1B misc. airfield improvement estimates include relocation of Taxiways A and B.

<sup>6</sup> Alternatives 1A, 1B, 2 include partial land acquisition of Renton High School parcel at a cost of \$ \$10.1 Million.

<sup>7</sup> RSA improvement estimate includes tunneling of Airport Way at a cost of \$46.2 Million.

<sup>8</sup> Alternatives 4 and 6 include partial land acquisition of Renton High School.

\* Alternatives 3 and 5 may require property acquisition and/or a long-term easement from the Washington Department of Natural Resources. Costs for such an acquisition are unknown at this time.

# Master Plan

## Summary

The information provide in this working paper provides a description of preliminary airfield alternatives for the purpose of meeting FAA design standards. The alternatives will be screened using standard master planning screening criteria as well as additional criteria developed using the goals established in the Airport's SMP. Following RAAC and FAA review and comment, the alternatives as well as the screening criteria may be revised and republished in subsequent working papers or chapters of the Airport Master Plan.

DRAFT