

# FAA 7100.41 Design Team Outcomes and Conceptual Procedures

Presentation to: DC Metroplex BWI Community Roundtable

By: Leslie Swann, Senior Advisor, FAA Airspace Services, AJV-1

Matthew Cathcart, DC Capital Project, PBN FAA Management Co-Lead

Bill Wise, DC Capital Project, PBN NATCA Co-Lead

Date: April 24, 2018



Federal  
Aviation  
Administration



National  
Air Traffic  
Controllers  
Association



- ❖ **This meeting does not constitute either a final decision of the FAA or a re-opening of the FAA's December 30, 2013 final Record of Decision for the Washington, D.C. Optimization of Air and Procedures in the Metroplex.**
- ❖ **This presentation depicts a number of conceptual procedural designs. Some aspects of these conceptual designs were developed in response to recommendations and input received from the Roundtable. Other aspects of the conceptual designs are based on potential opportunities to enhance the safety of the National Airspace System. We look forward to receiving your feedback on these conceptual procedure designs.**



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# Agenda

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- ❖ **Purpose of Tonight's Meeting**
- ❖ **Historic Review**
- ❖ **How Did We Get Here?**
- ❖ **Here's Where We Are**
- ❖ **Design Considerations and Outcomes**
- ❖ **Next Steps**
- ❖ **Roundtable Member Questions**
- ❖ **Break**
- ❖ **Story Board Stations**

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# Purpose of Tonight's Meeting

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## ❖ Status of Working Group

- Conceptual designs completed
- FAA will remain responsive to public's concerns

## ❖ Meeting Framework

- Presentation to Roundtable
  - Reference acronym list
- Questions to be answered by Subject Matter Experts (SMEs) at workstations

## ❖ Recommendation from Roundtable

- Based on the conceptual changes and designs presented tonight, the Roundtable will submit a recommendation identifying a preferred option



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# Historic Review

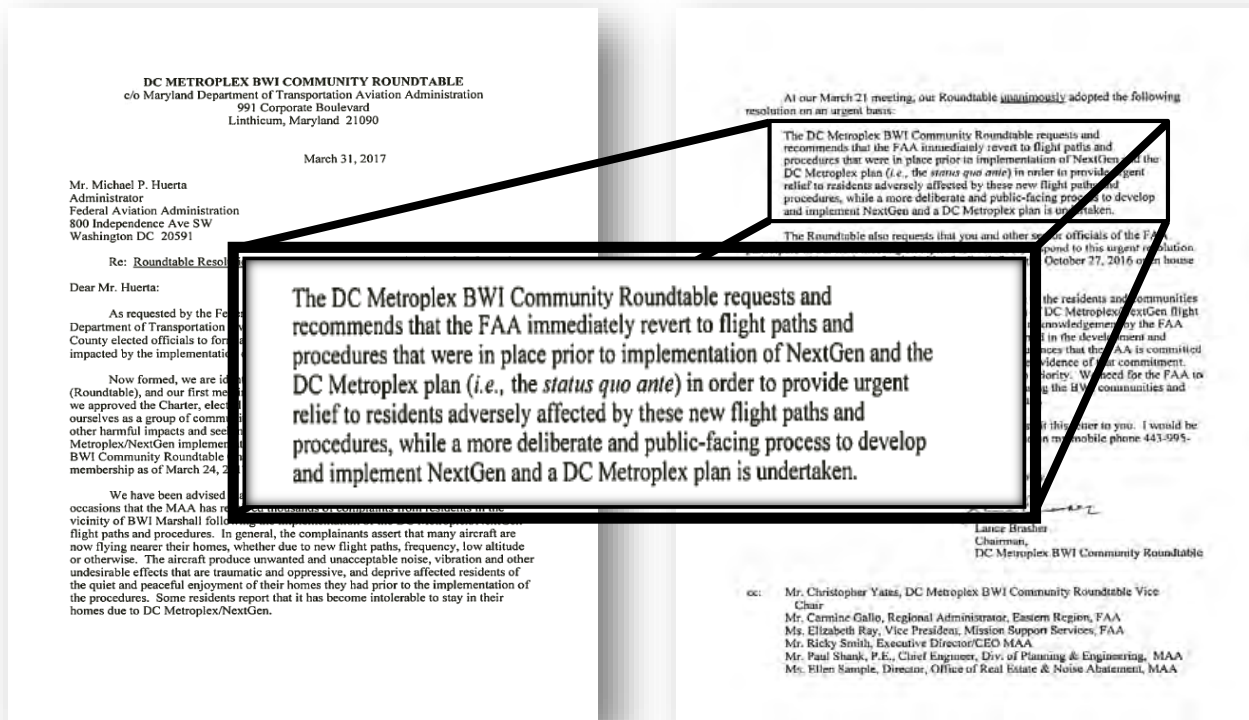
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- ❖ **BWI Opens For Business June 24<sup>th</sup> 1950**
  - Busiest DC/BWI Metro area airport by passenger count
- ❖ **Congress Expressly Directed the Modernization of the National Airspace System**
  - FAA Modernization and Reform Act of 2012, H.R. 658, P.L. 112-95
- ❖ **DC Metroplex**
  - Environmental Assessment (EA) prepared
    - June 20, 2013: Draft EA document released and available for public review and comment
    - June 20, 2013 - July 20, 2013: Written comments regarding Draft EA accepted by FAA
    - December 30, 2013: FAA issued a Finding of No Significant Impact and Record of Decision (FONSI-ROD) for the project
- ❖ **Final Designs for BWI Implemented April 2015 and DC Metroplex Concluded**
- ❖ **Moving Forward Any Change Would Constitute a New Action**

# How Did We Get Here?

## ❖ Formation of Community Roundtable (RT)

- RT created to represent and consolidate community concerns
- RT recommended return to pre-Metroplex operation



# RT September 2017 Letter to FAA

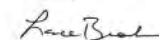
DC METROPLEX BWI COMMUNITY ROUNDTABLE  
c/o Maryland Aviation Administration  
P.O. Box 8766  
BWI Airport, MD 21240-0766

September 8, 2017

Michael P. Huerta  
Administrator

The mental and physical trauma, loss of peaceful enjoyment of homes and destruction of property values being suffered by thousands of residents are real. We look forward to the speedy implementation of solutions that correct the failings of the new flight paths and procedures of the essence.

Sincerely,



Lance Brasher  
Chair

Cardin  
Van Hollen, Jr.  
Harris, M.D.  
Ruppersberger  
James  
Brown

Roundtable Vice Chair  
Services, FAA  
& Engineering, MAA

path diagrams  
ch 31, 2017  
AA, dated April 18, 2017

governor letter to the FAA, dated May 11, 2017  
governor letter to the DOT, dated August 1, 2017  
Attachment 6: FAA Posted DC Metroplex flight path diagrams  
Attachment 7: Roundtable letter to the FAA, dated July 25, 2017

...the mental and physical trauma, loss of peaceful enjoyment of property values due to changed arriving and departing aircraft flight paths and procedures arising out of or in connection with the DC Metroplex/NextGen scheme, on March 20, 2017, the newly formed DC Metroplex/NextGen Roundtable unanimously adopted a resolution to request that the FAA place prior to DC Metroplex/NextGen (the "Status Quo Ante Resolution"). This letter, prepared by the FAA, containing representations regarding the DC Metroplex/NextGen BWI departure and arrival procedures submitted to you in a letter from the Roundtable on August 1, 2017, and the Maryland Congressional Delegation collectively on August 1, 2017. Subsequently, Maryland Governor Larry Hogan signed the Status Quo Ante Resolution. Subsequently, Maryland Governor Hogan signed the Status Quo Ante Resolution on May 11, 2017 and to the Secretary of the DOT on August 1, 2017. These letters are attached as attachments 6 and 7. Anundel, Baltimore and Howard Counties have also signed the Status Quo Ante Resolution.

On May 12, 2017, Elizabeth Ray responded on behalf of the FAA to the Roundtable's letter stating the FAA's commitment on a high-priority basis to address Status Quo Ante Resolution. The Roundtable is appreciative of the commitment stated in Ms. Ray's letter and other communications and the efforts of the FAA team to date, including those of Bennie Hutto, Robert Owens and others. To be clear, however, we believe FAA leadership has full responsibility for and should take ownership for correcting the intuitively apparent and terribly harmful design defects in the DC Metroplex/NextGen scheme. Further, the reliance placed by the FAA on arcane measures for assessing significant environmental impact of the DC Metroplex/NextGen scheme was inexcusable and the implementation of the scheme following experience in Phoenix and other jurisdictions without correcting these obvious design defects,

1. *New flight paths have been created by DC Metroplex/NextGen; FAA must revert to old flight paths.*

2. *DC Metroplex/NextGen has resulted in a concentration of flight paths in narrow corridors; FAA must revert to old procedures that were effective in achieving dispersion.*

3. *FAA procedures permit aircraft to fly at altitudes too low; procedures must be modified to require aircraft to fly at the highest safe altitude at all times during departures and arrivals.*

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# How Did We Get Here? (cont)

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- ❖ **Formation of 7100.41 PBN Full Working Group (FWG)**

- August 2017 FAA formed PBN FWG via FAA Order 7100.41
- FWG consists of industry, air traffic facilities, and the MAA

- ❖ **FWG Worked with Industry, Air Traffic Facilities, and MAA**

- Reviewed RT recommendation to determine operational feasibility
- Designed procedures in an attempt to mitigate RT concerns and address FAA procedural requirements



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# Here's Where We Are

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- ❖ **FAA Has Heard, and Wishes to Address, RT Concerns**
- ❖ **Tonight's Presentation – Two-Fold**
  - Describe conceptual changes that address RT concerns
  - Describe conceptual changes due to criteria requirements
    - Changes based on ongoing modifications to advance the National Airspace System (NAS)



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# Design Constraints and Parameters

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## ❖ Any Request to Change Procedures

- FAA *must* bring procedures up to current FAA criteria (code) and make revisions based on:
  - Updated aircraft types
  - Updated aircraft capabilities
  - Updated technology
  - Updated mandates
- FAA needs to evaluate how local changes may adversely affect the entire NAS

## ❖ Congressional Requirement to Modernize the National Airspace System

## ❖ FAA Will Not Return to Vectoring as a Primary Means of Air Traffic Control for All Departing and Arriving Aircraft From/To BWI



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# Design Considerations and Outcomes

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# Procedure Design Considerations/Benefits

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## ❖ Safety Concerns

- Criteria (code) changes resulting in procedure modifications – outside RT input

## ❖ Airspace Constraints

- Restricted / Prohibited area avoidance
- Other large metropolitan airport arrivals/departures (DCA, IAD, PHL)

## ❖ Procedural Design Benefits

- Automated climb/descent
- Reduced controller/pilot interactions
- Procedural de-confliction of aircraft
- Fewer level-offs

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# Conceptual Procedure Designs

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## ❖ **Standard Instrument Departures (SID)**

Amendments based on RT input

- TERPZ
- LINSE (new procedure)
- CONLE
- FIXET

## ❖ **RNAV Terminal Transition Routes (T-Routes)**

## ❖ **Standard Terminal Arrivals (STAR)**

Amendments based on criteria (code)

- ANTHM
- MIIDY
- RAVNN (above 15,000 feet only)
- TRISH

# Standard Instrument Departures (SID)

## ❖ Runway Usage

## ❖ Climb Via

- Reduces pilot/controller interactions
- Deconflicts with:
  - Overflight traffic
  - Arrival traffic
- Reduces level-offs

**PDARS**  
Runway Usage  
For PCT from 01/01/2017 to 12/31/2017

Facility	PCT
Airport	BWI

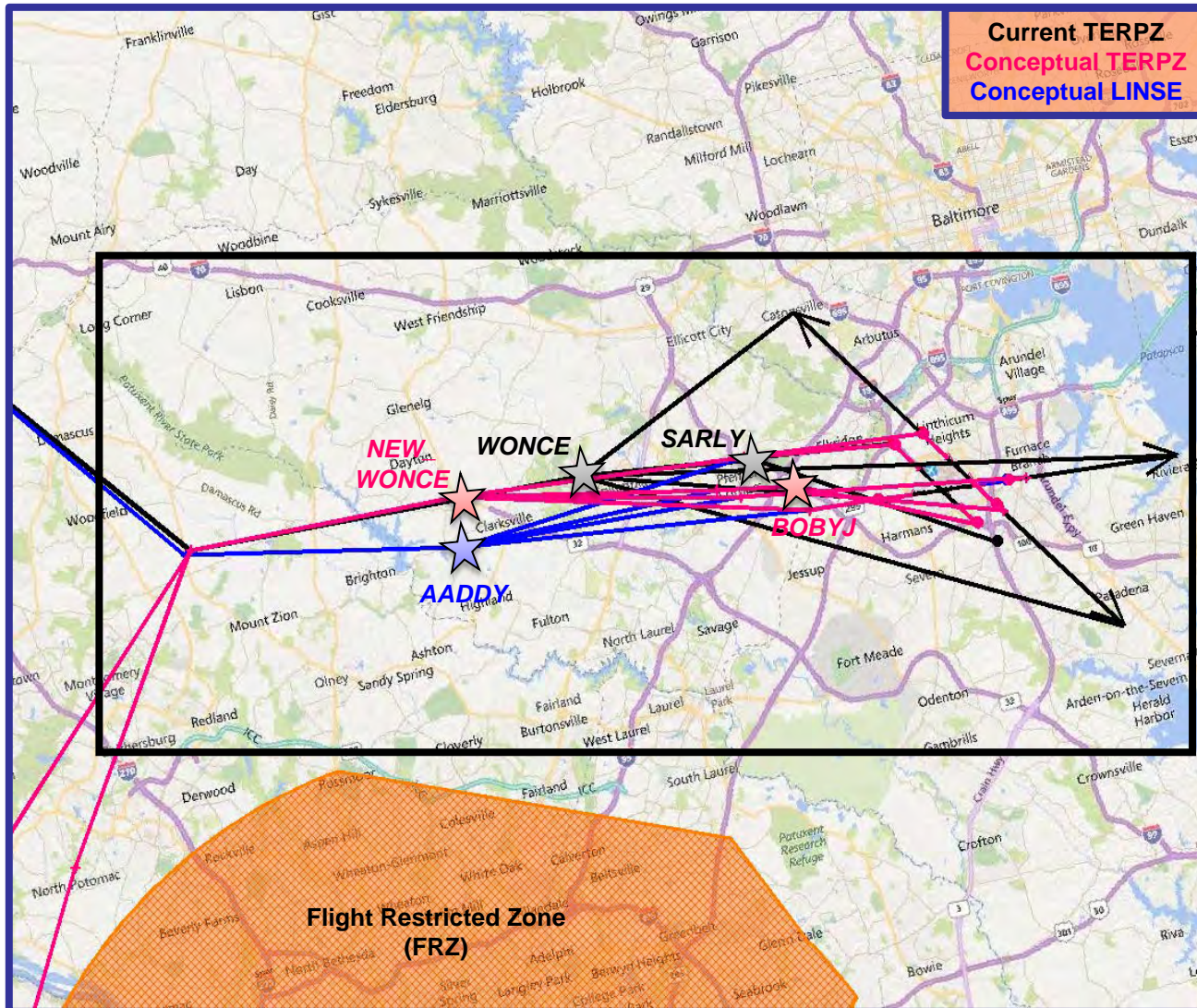
  

Operation	Runway					
	10	33L	33R	15L	15R	28
Departure	606	382	8,661	3,548	33,623	81,023
	0.5%	0.3%	6.8%	2.8%	26.3%	63.4%

## ❖ Return to Pre-Metroplex Tracks Via...

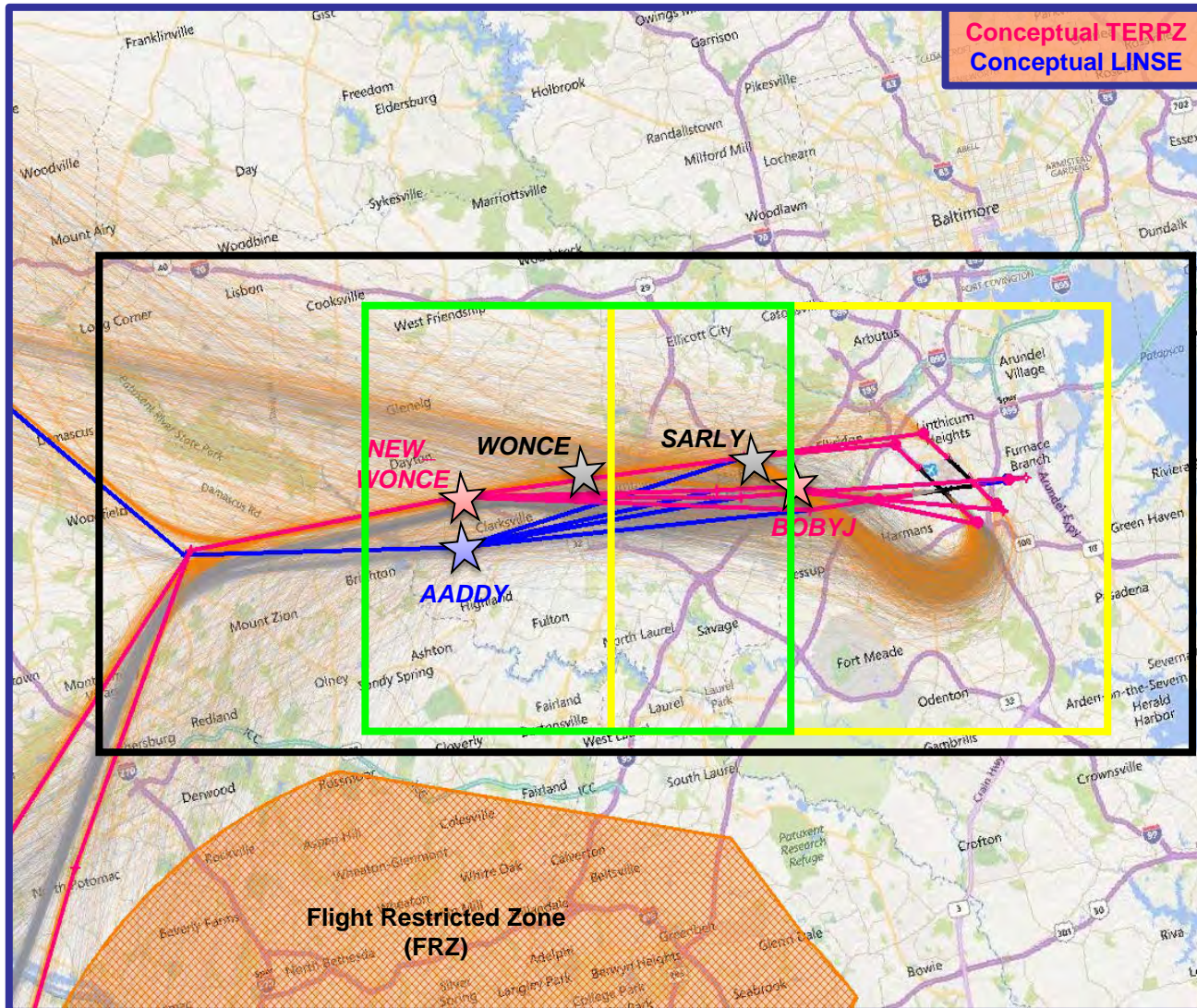
- Voluntary noise abatement procedures
- New SID to mimic pre-Metroplex tracks

# BWI TERPZ/LINSE RNAV SIDs (Departures)



- In attempt to mimic dispersal, Current TERPZ split into two procedures:
- Conceptual TERPZ  
 Serves jet departures to the west and southwest  
 Anticipated usage = 74%
- Conceptual LINSE  
 Serves jet departures to the northwest  
 Anticipated usage = 26%
- Designed utilizing pre-Metroplex tracks
- Designed considering current voluntary noise abatement procedures

# BWI TERPZ/LINSE RNAV SIDs (Departures)



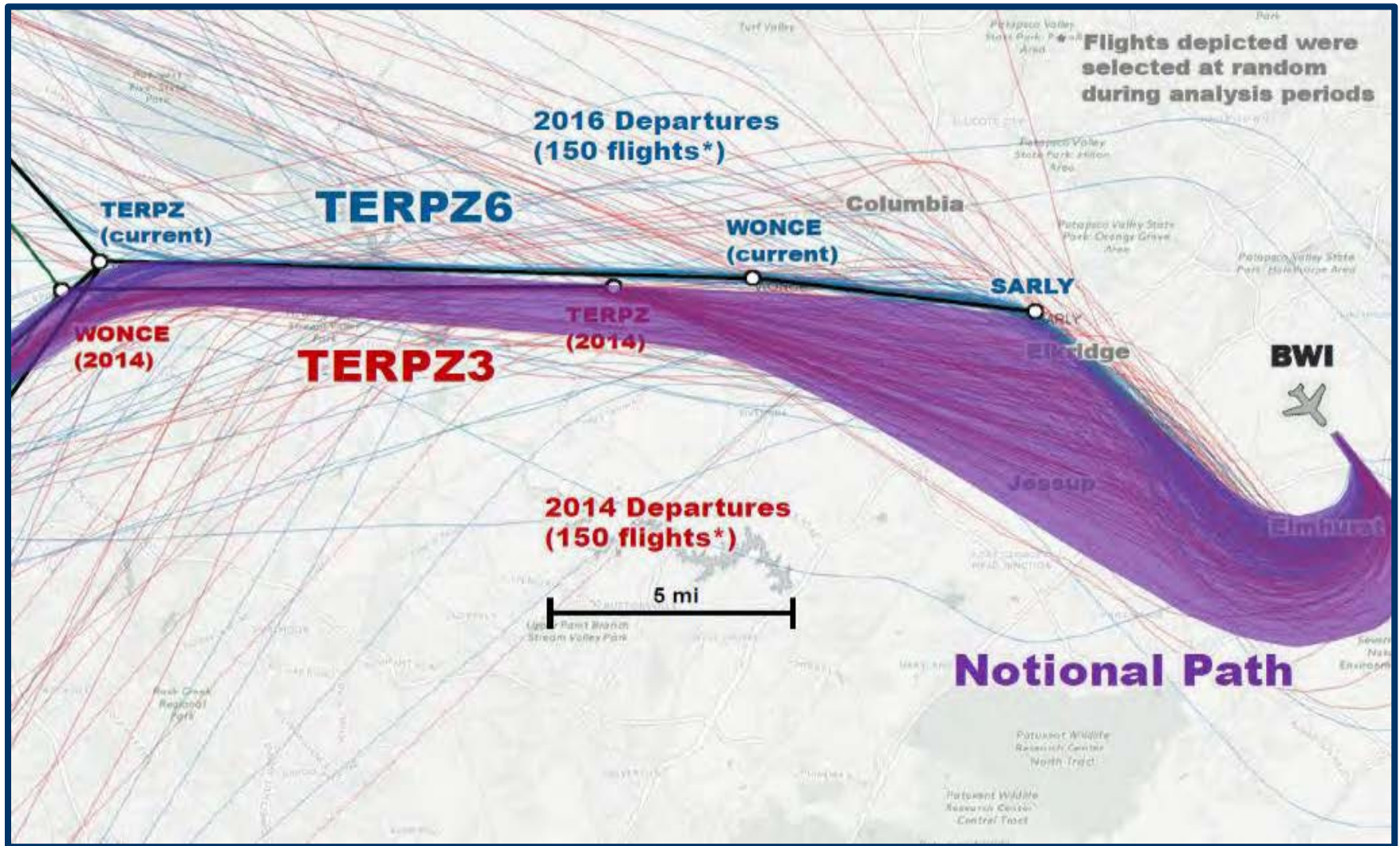
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**Conceptual LINSE**

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- Pre-Metroplex tracks (Feb 2012)
- **Current tracks** (Feb 2017)

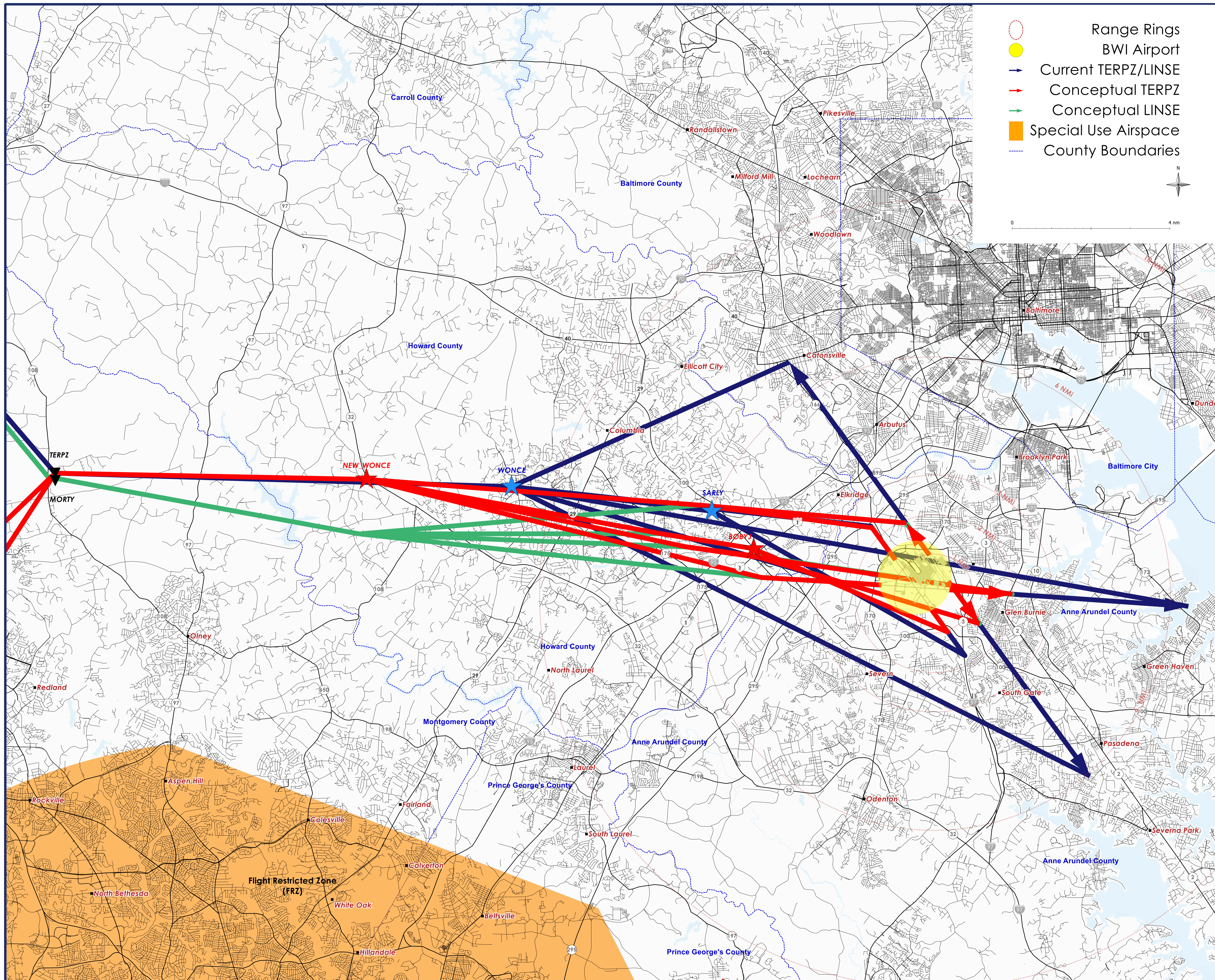
2017 Departure Runway Usage		
Runway	Percent Usage	Operation Counts
10	0.5%	606
33L/R	7.1%	9,043
15L/R	29.1%	37,171
28	63.4%	81,023



# Previous Roundtable Briefing Graphic (15L/R)



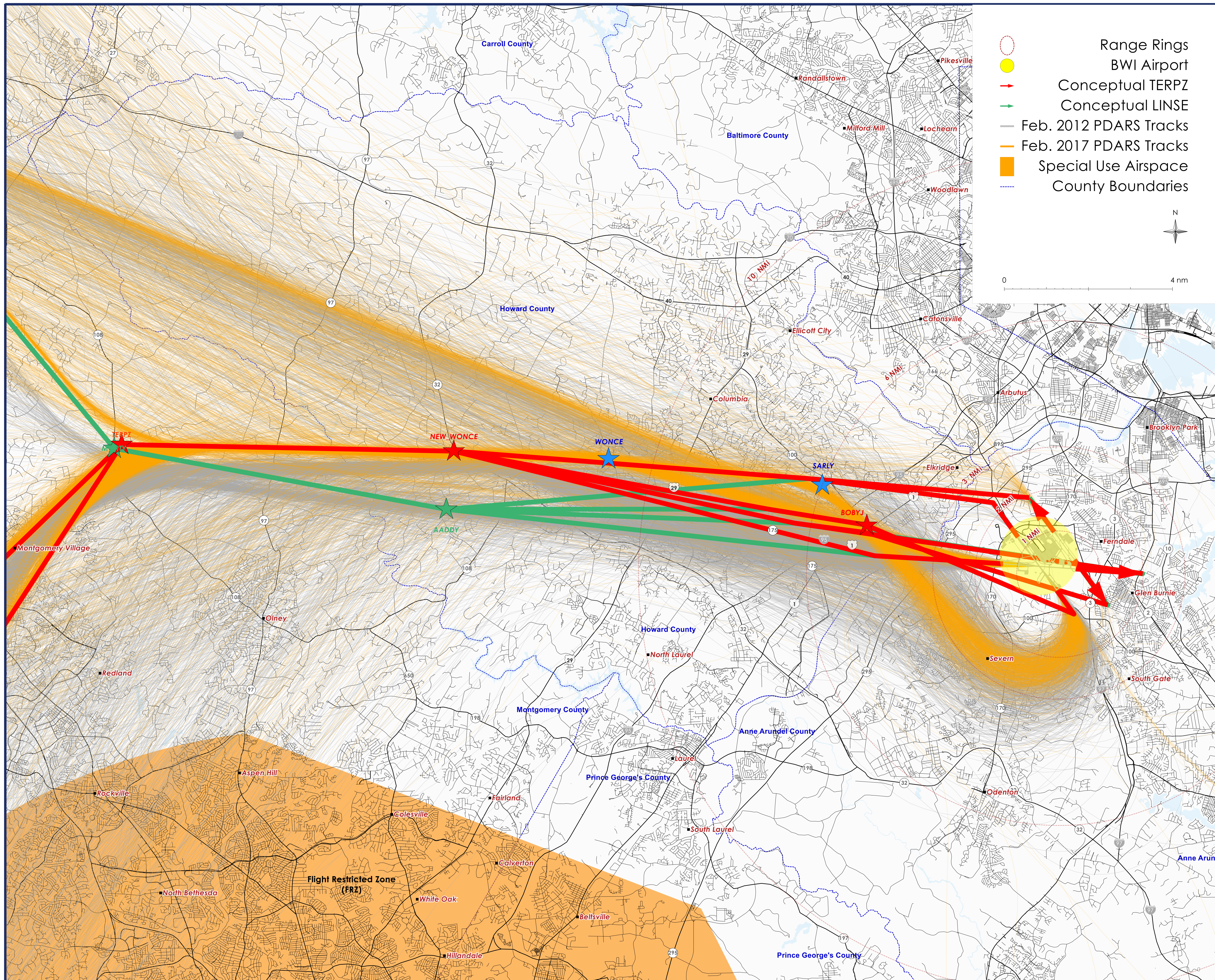
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- Designed to consider current voluntary noise abatement procedures



# BWI TERPZ/LINSE RNAV SIDs (Departures)



- Range Rings
- BWI Airport
- Conceptual TERPZ
- Conceptual LINSE
- Feb. 2012 PDARS Tracks
- Feb. 2017 PDARS Tracks
- Special Use Airspace
- County Boundaries

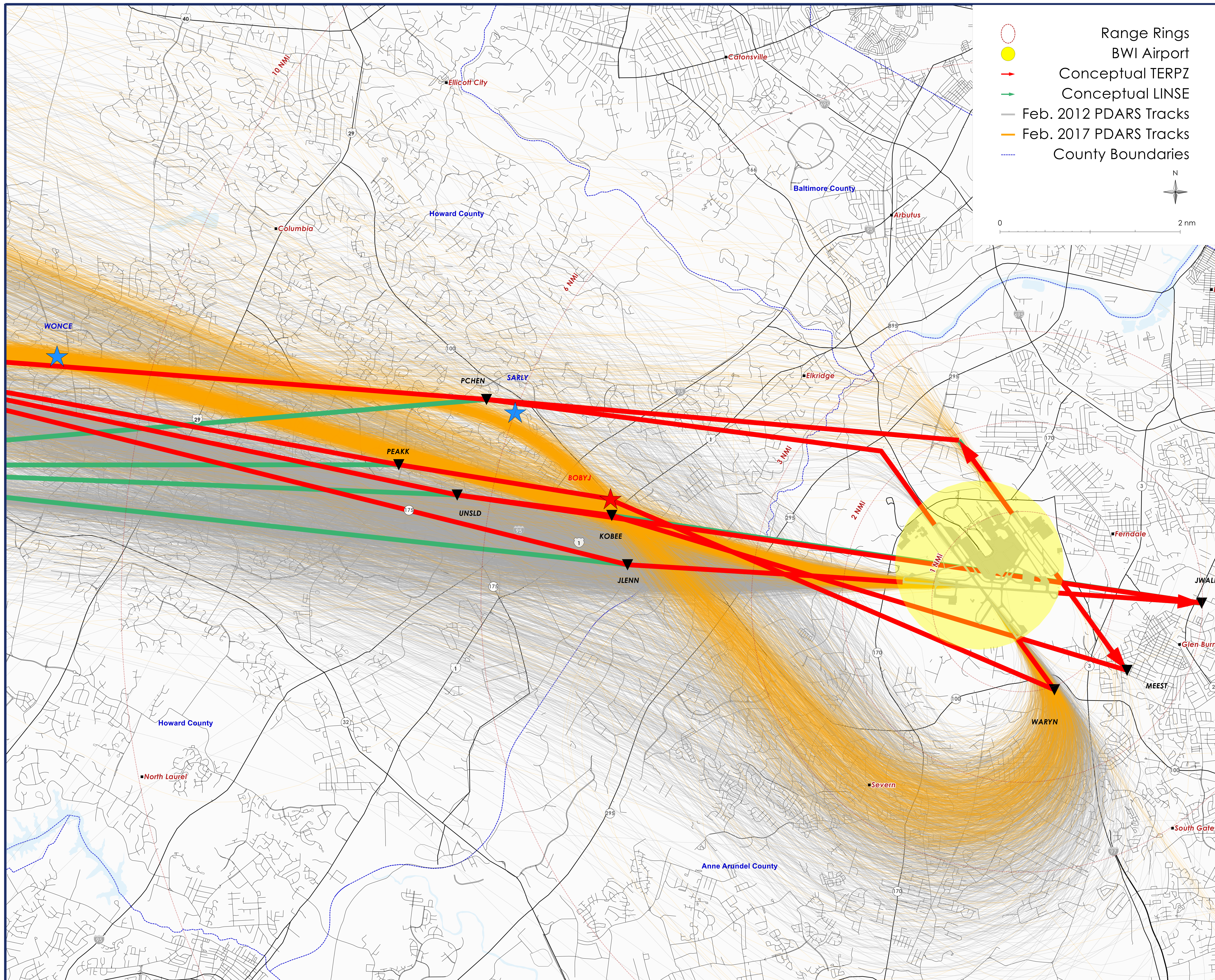


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- TERPZ/LINSE – All Runway Transitions

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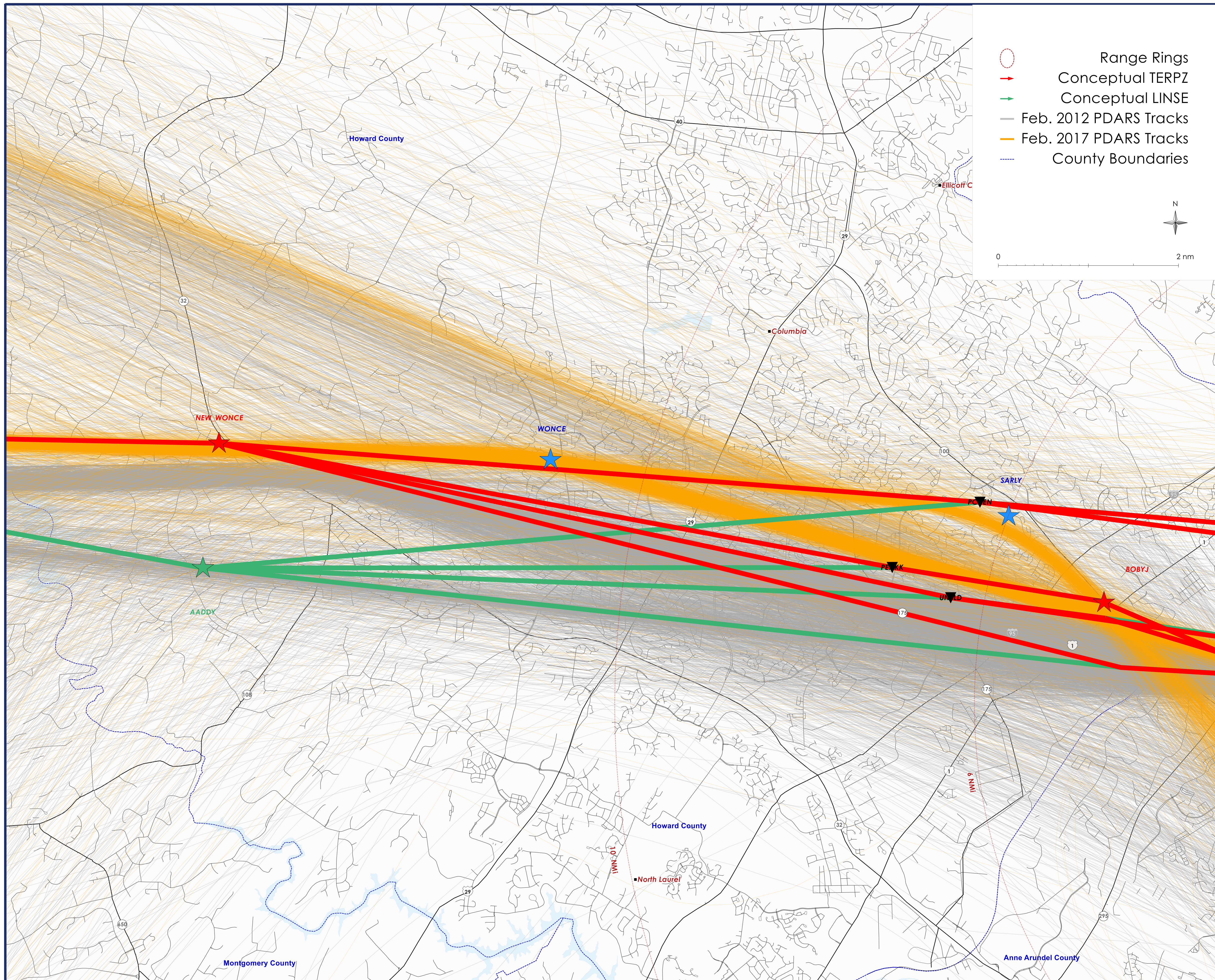


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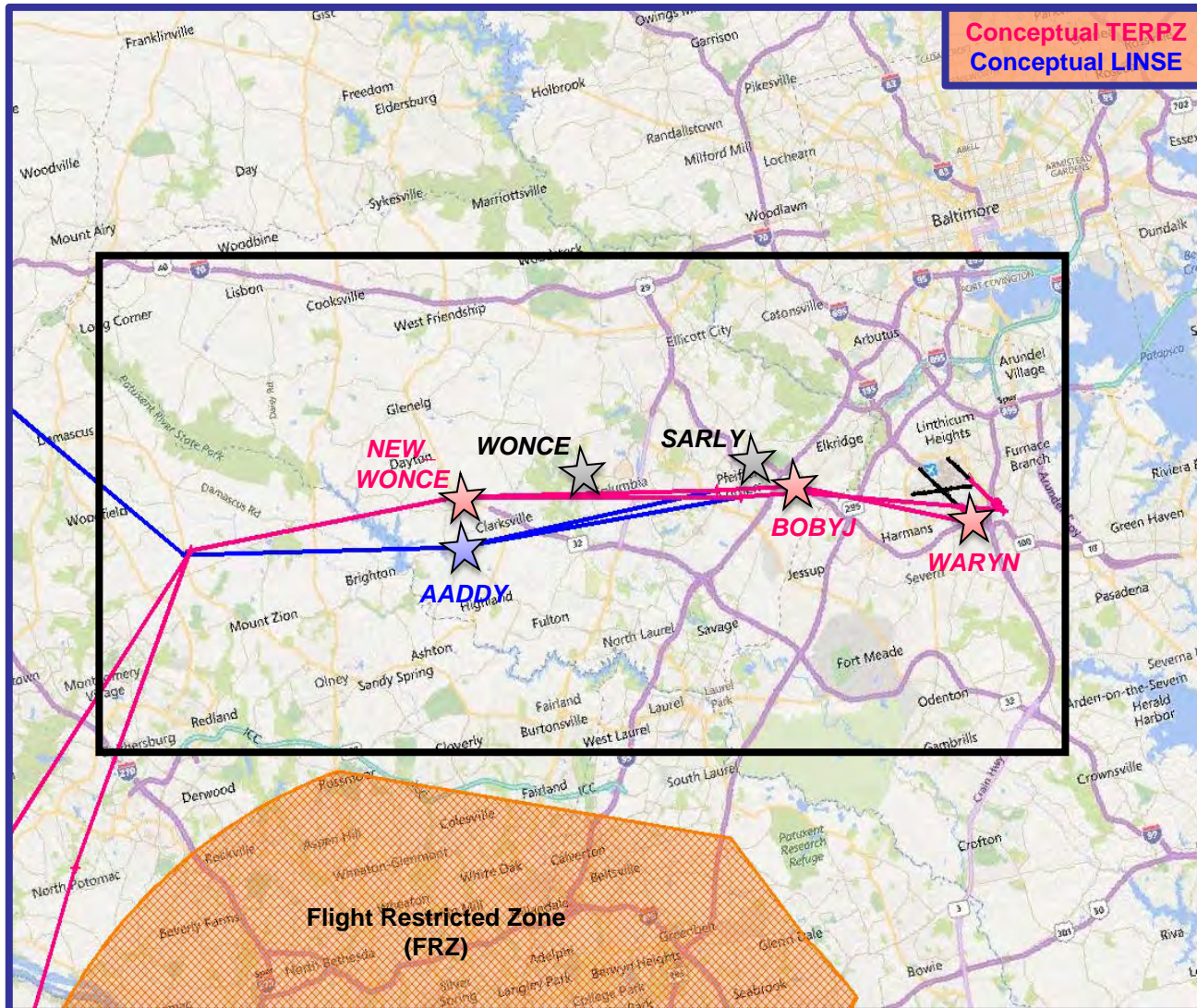


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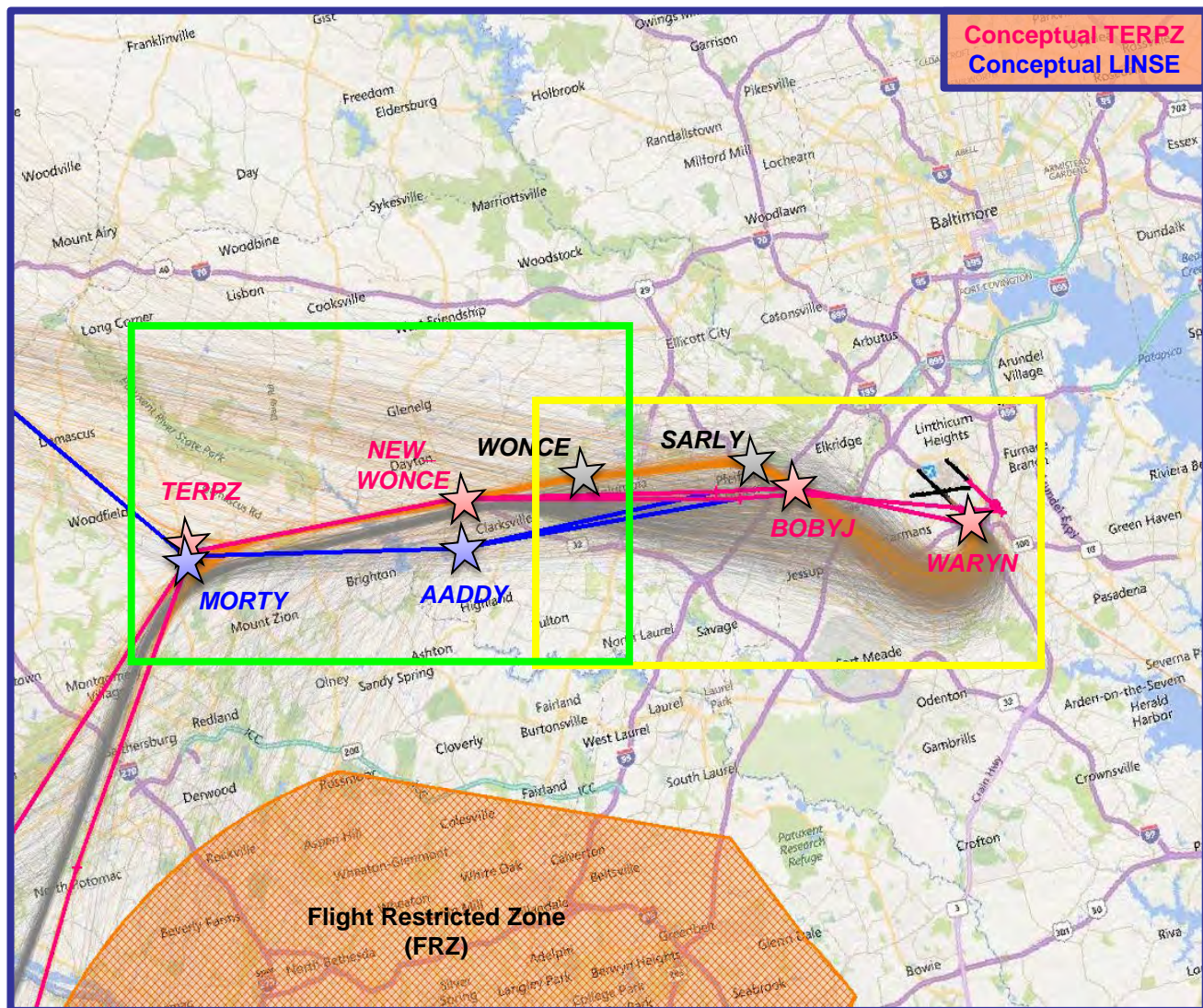


# BWI TERPZ/LINSE RNAV SIDs 15L/R (Departures)



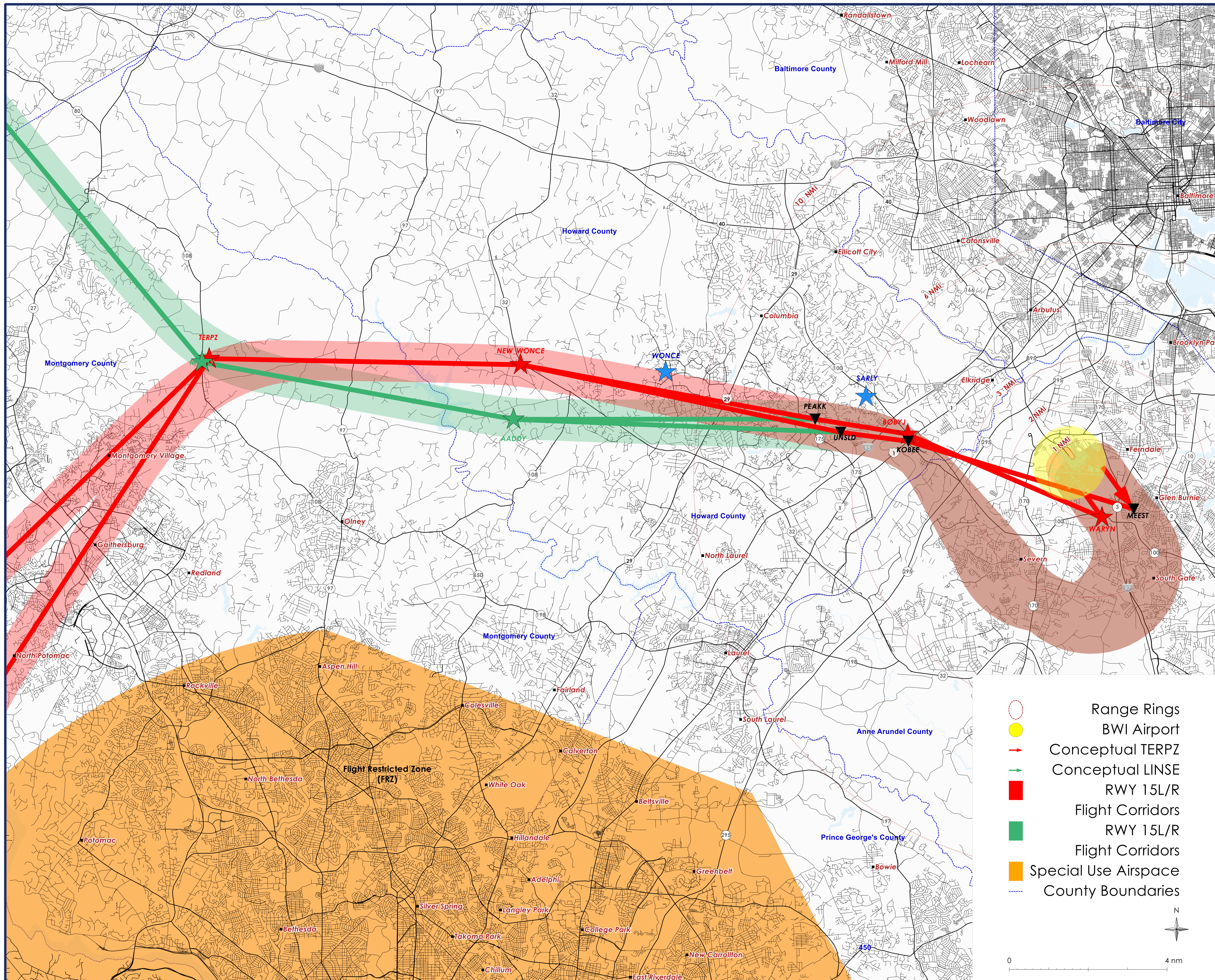
- Runway 15L/R Usage:
  - ✓ 29.1% (37,171 flights/year)
- WARYN added 0.7 nm from end of runway to conform with current voluntary noise abatement procedures (1 DME from BAL VOR)
- Design Requirements
  - ✓ Initial departure off 15R requires a non-standard climb gradient and speed restriction
  - ✓ Still requires industry concurrence and flight standards approval

# BWI TERPZ/LINSE RNAV SIDs 15L/R (Departures)



- Runway 15L/R Usage:
  - ✓ 29.1% (37,171 flights/year)
- Pre-Metroplex tracks (Feb 2012)
- **Current tracks (Feb 2017)**
- SARLY removed
- Conceptual design track moved 1.39 nm southeast at BOBYJ
- WONCE moved 3.68 nm west and temporarily named NEW\_WONCE
- AADDY is on the new LINSE procedure to help mimic pre-Metroplex track dispersion
- MORTY is on the new LINSE procedure 0.2 nm southwest of TERPZ

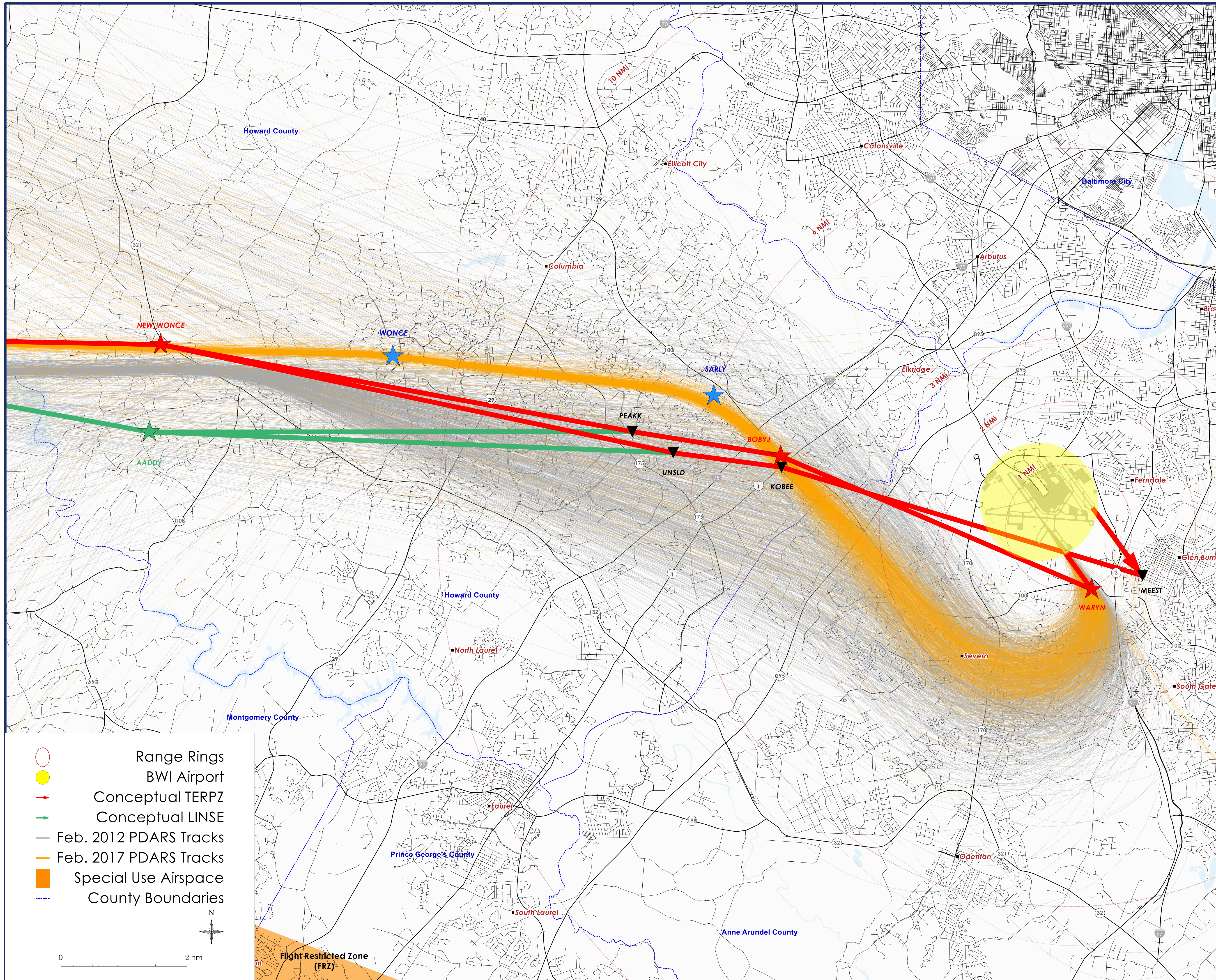
# BWI TERPZ/LINSE RNAV SIDs (Departures) RWY 15L/R



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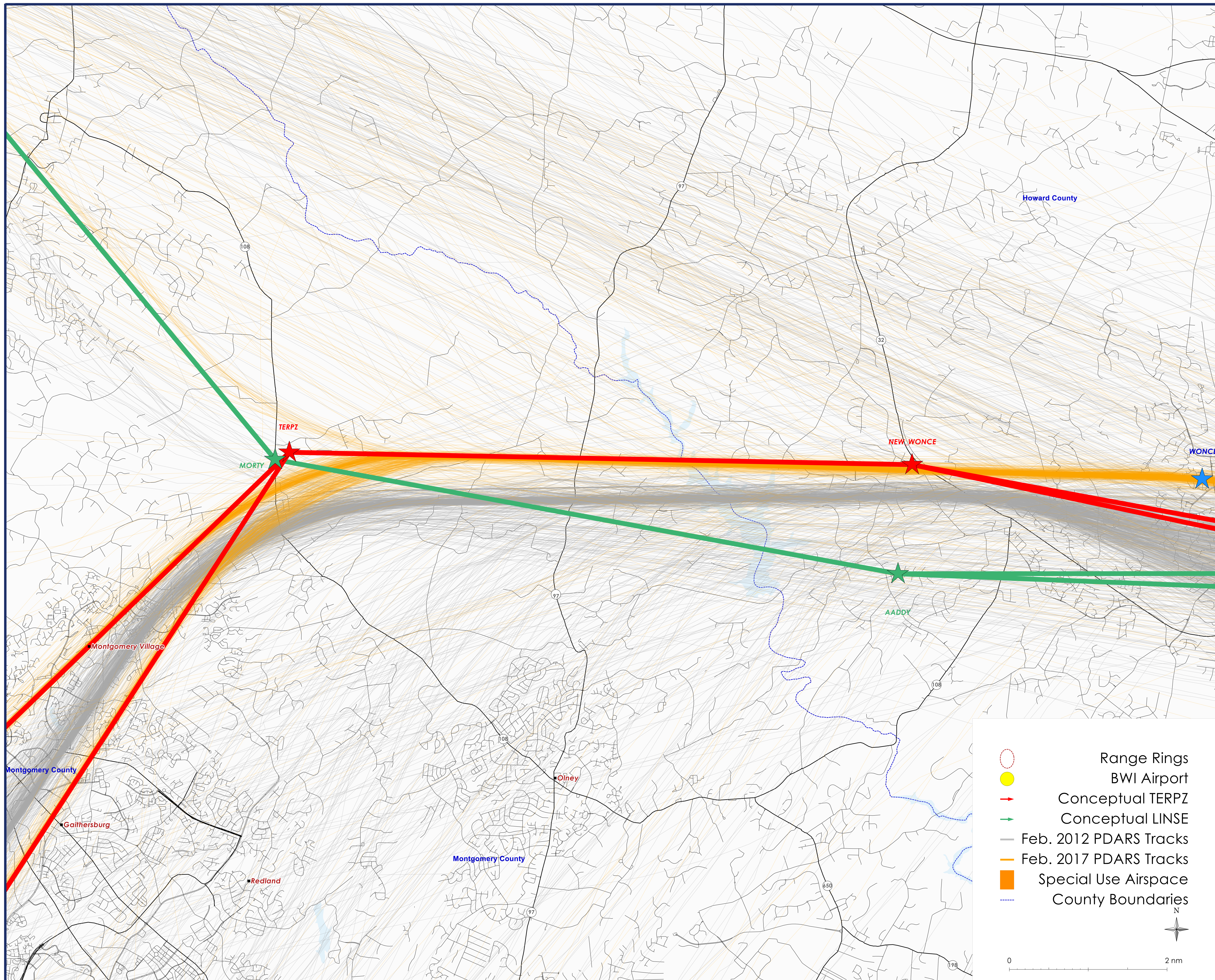
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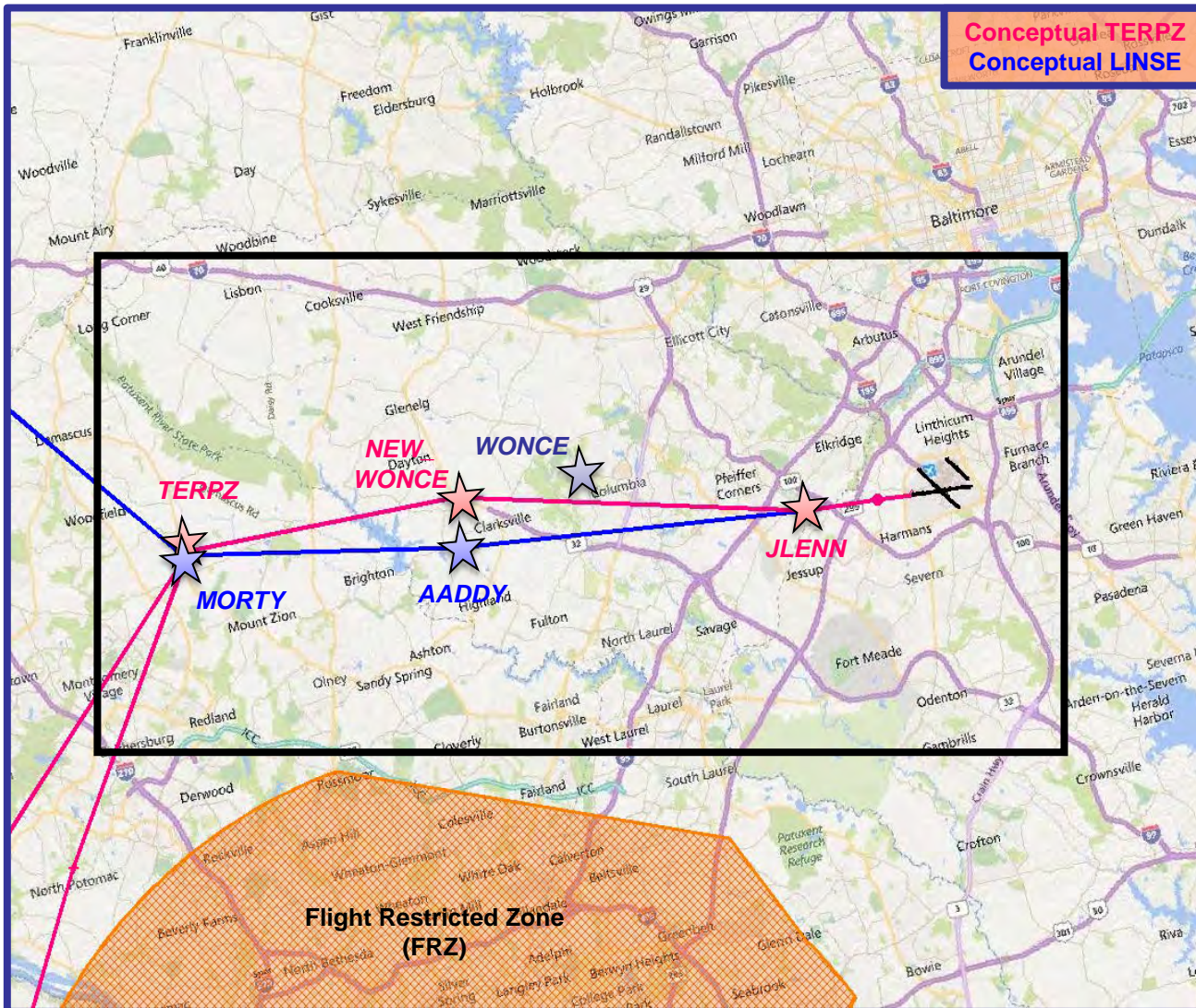
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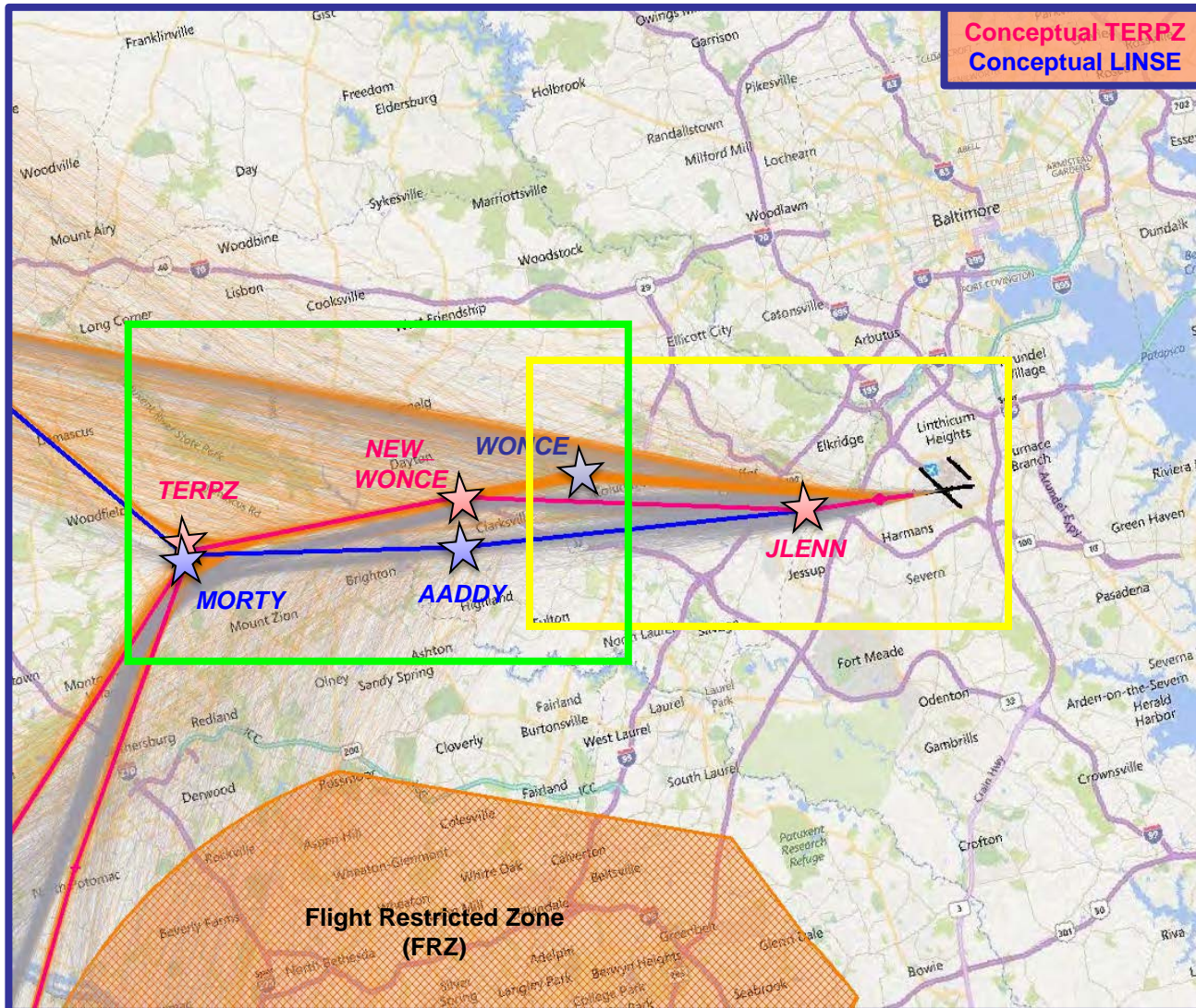


# BWI TERPZ/LINSE RNAV SIDs 28 (Departures)



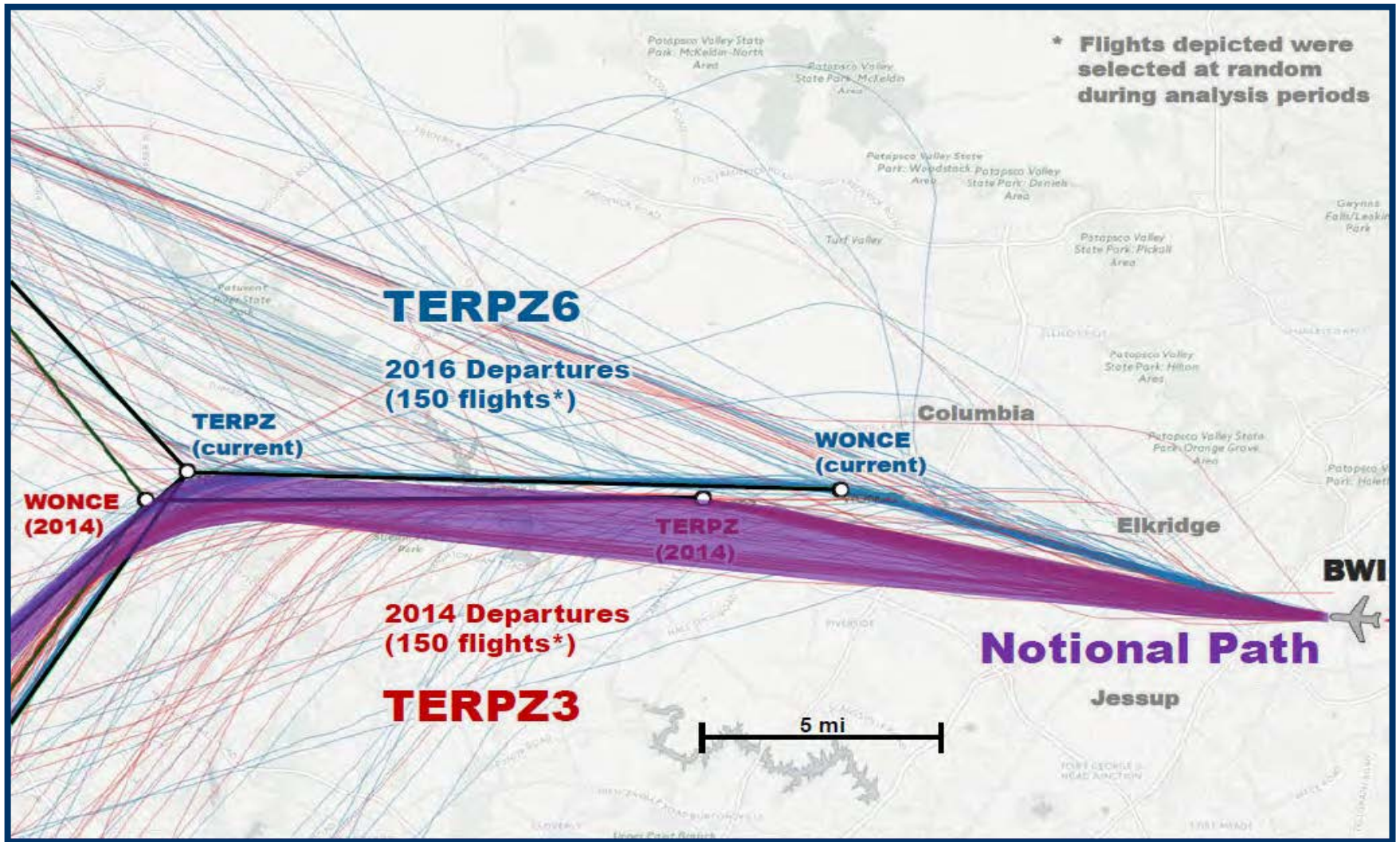
- **Runway 28 Usage:**
  - ✓ 63.4% (81,023 flights/year)
- **Conceptual TERPZ** Serves jet departures to the west and southwest  
Anticipated usage = 74%
- **Conceptual LINSE** Serves jet departures to the northwest  
Anticipated usage = 26%
- **JLENN** added 3 nm from the end of the runway to conform with current voluntary noise abatement procedures
- **WONCE** moved 3.68 nm west and temporarily named **NEW\_WONCE**

# BWI TERPZ/LINSE RNAV SIDs 28 (Departures)

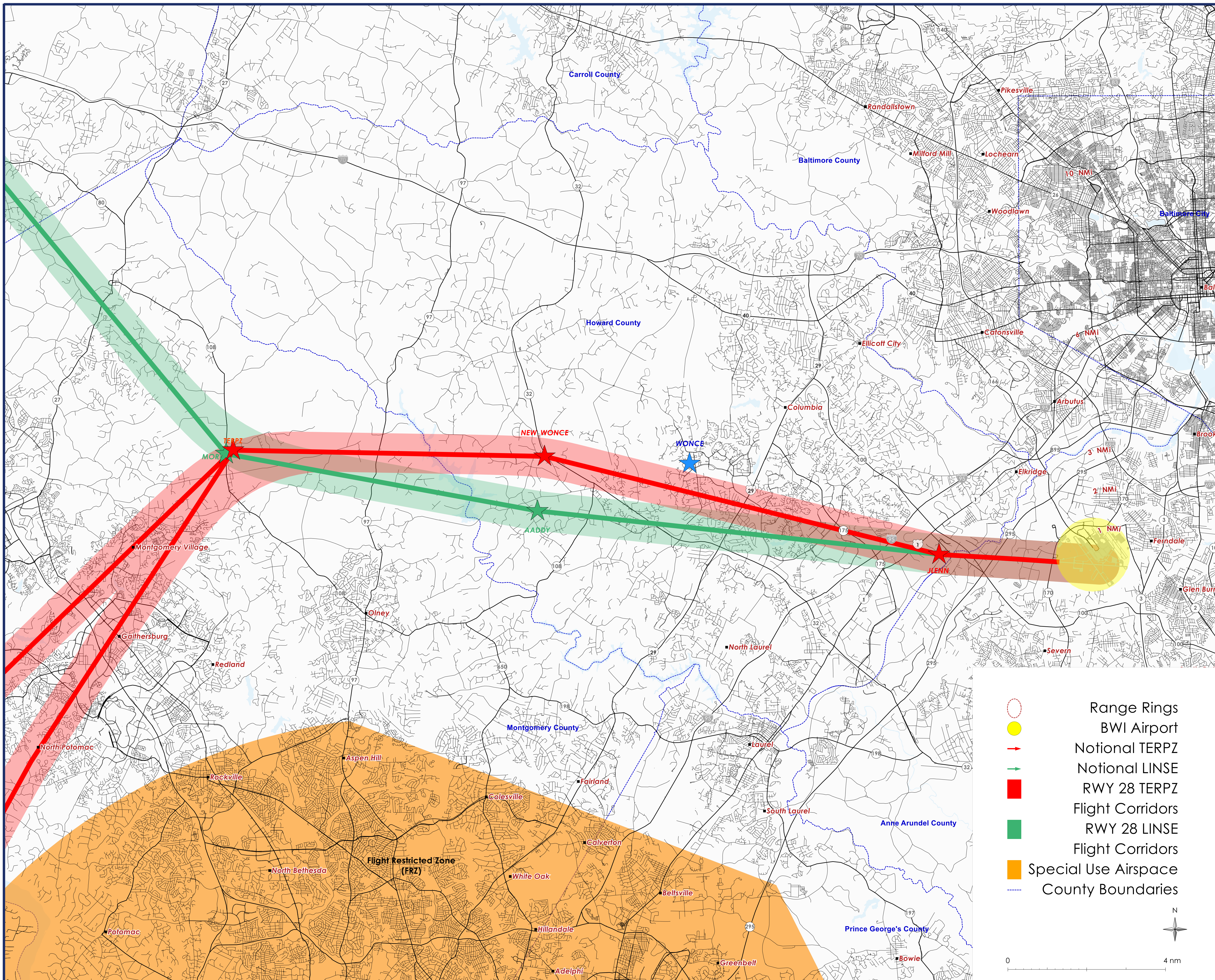


- **Runway 28 Usage:**
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- **Pre-Metroplex tracks (Feb 2012)**
- **Current tracks (Feb 2017)**
- **AADDY is on the new LINSE procedure to help mimic pre-Metroplex track dispersion**
- **MORTY is on the new LINSE procedure 0.2 nm southwest of TERPZ**

# Previous Roundtable Briefing Graphic (28)



# BWI TERPZ/LINSE RNAV SIDs (Departures) RWY 28

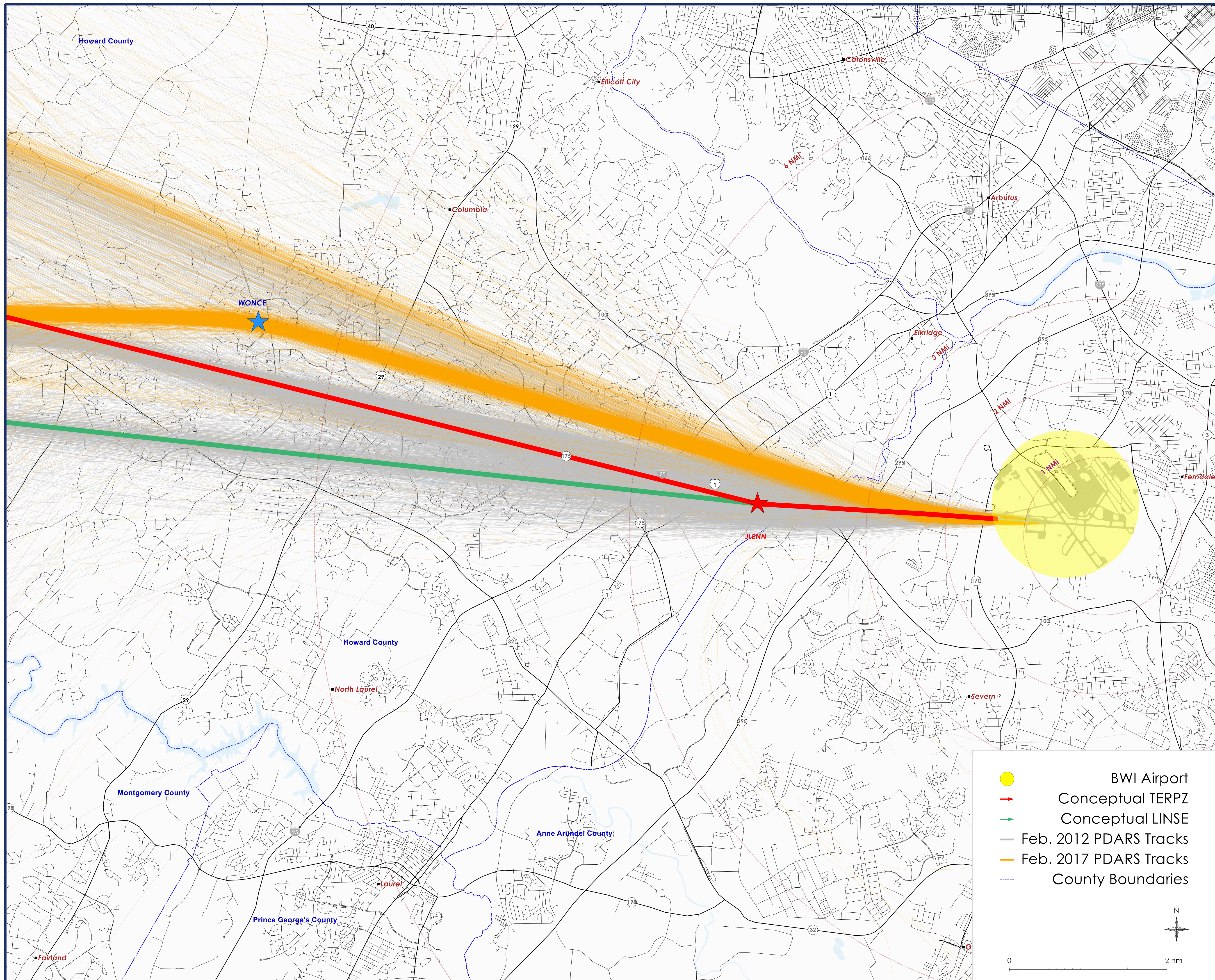


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○ Range Rings  
● BWI Airport  
→ Notional TERPZ  
→ Notional LINSE  
■ RWY 28 TERPZ  
■ RWY 28 LINSE  
■ Flight Corridors  
■ Special Use Airspace  
--- County Boundaries



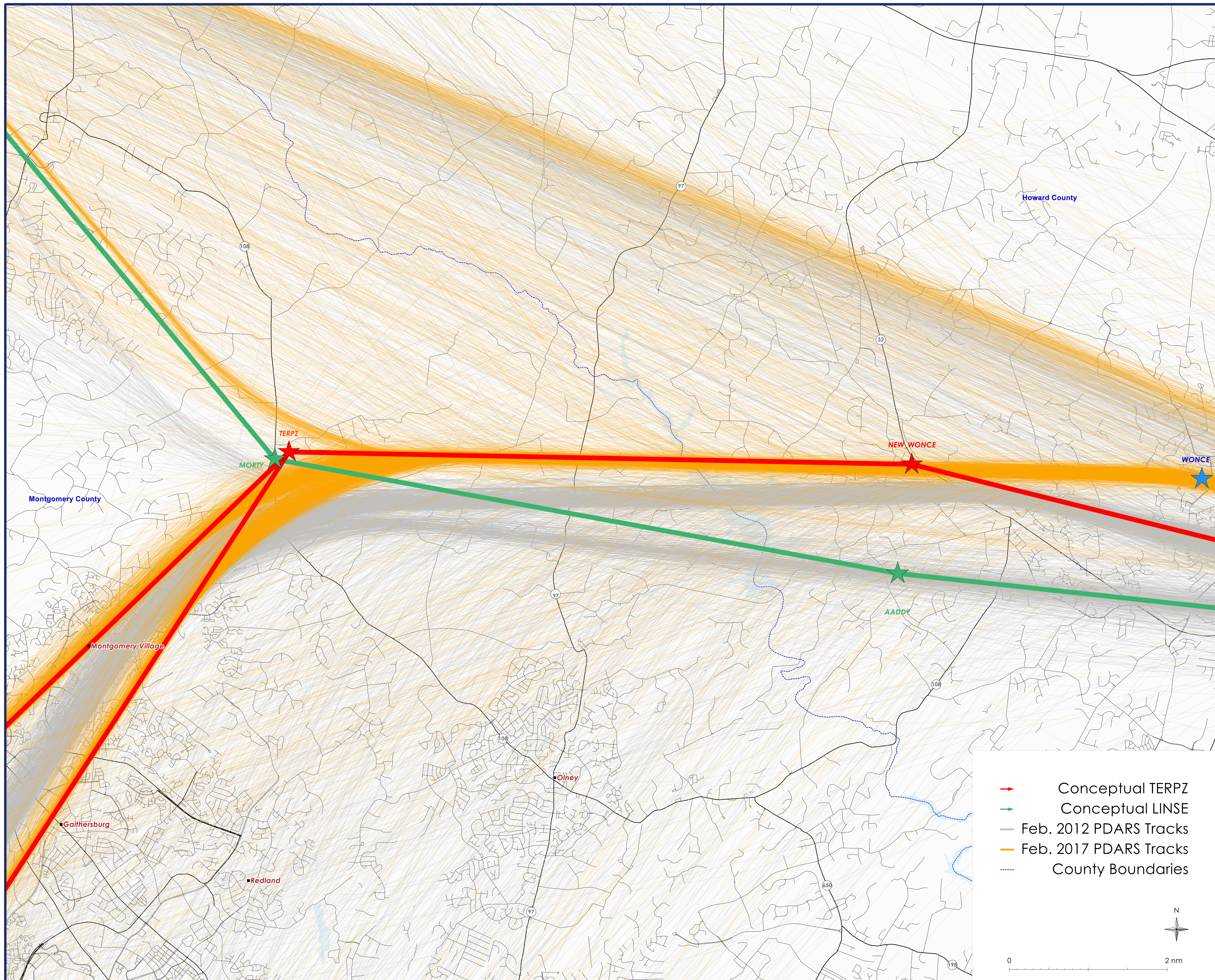
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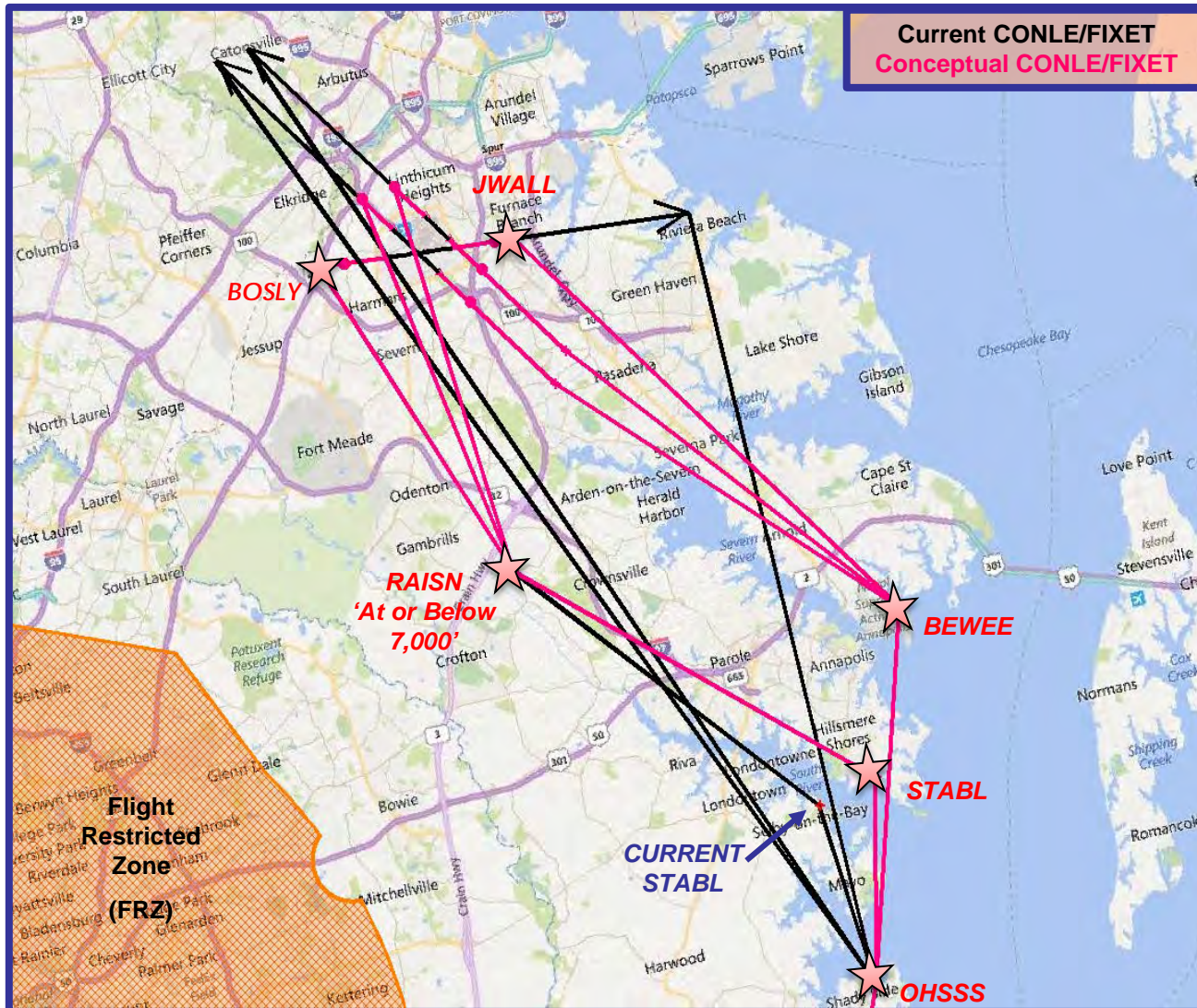
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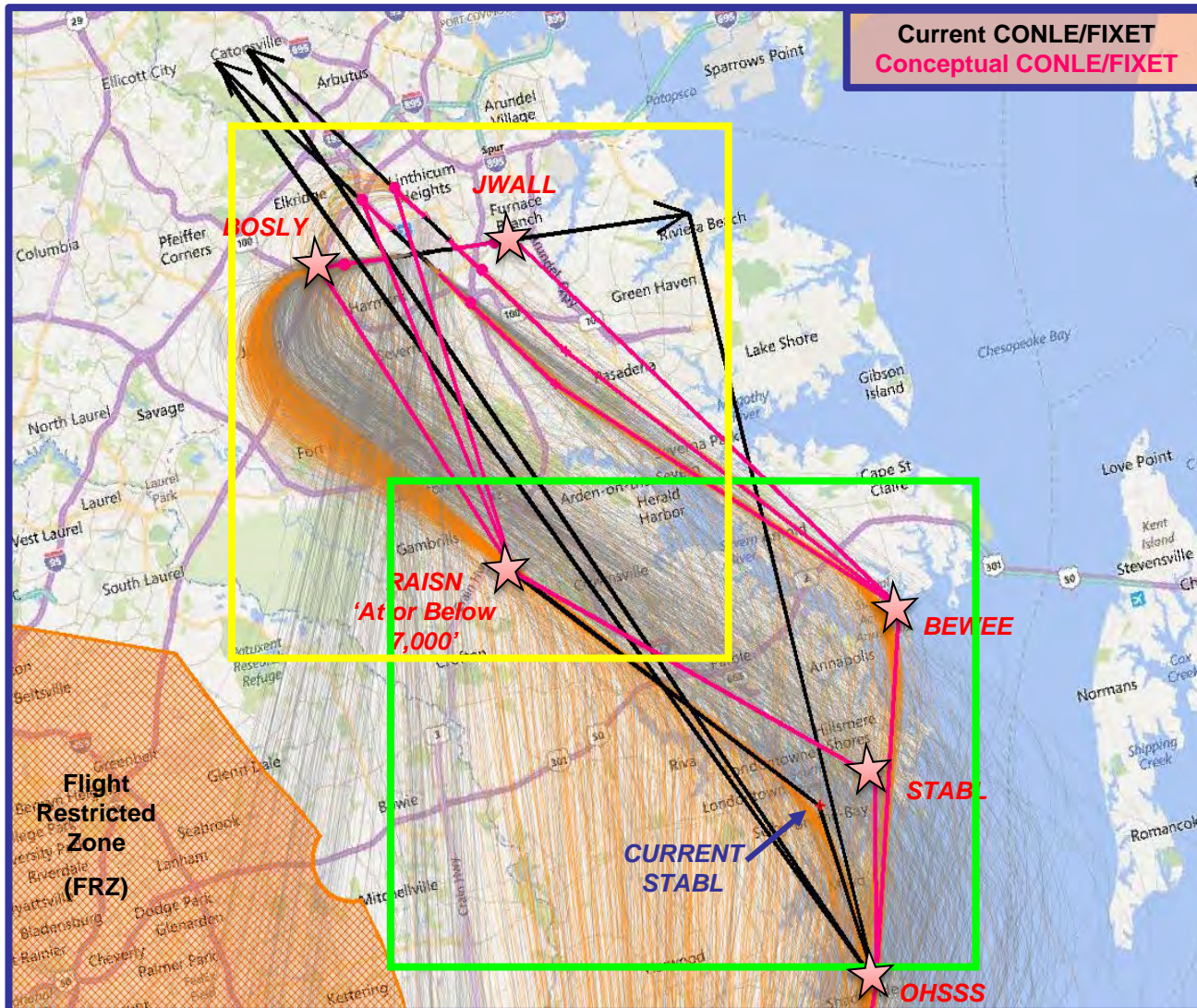


# BWI CONLE/FIXET RNAV SID (Departure)



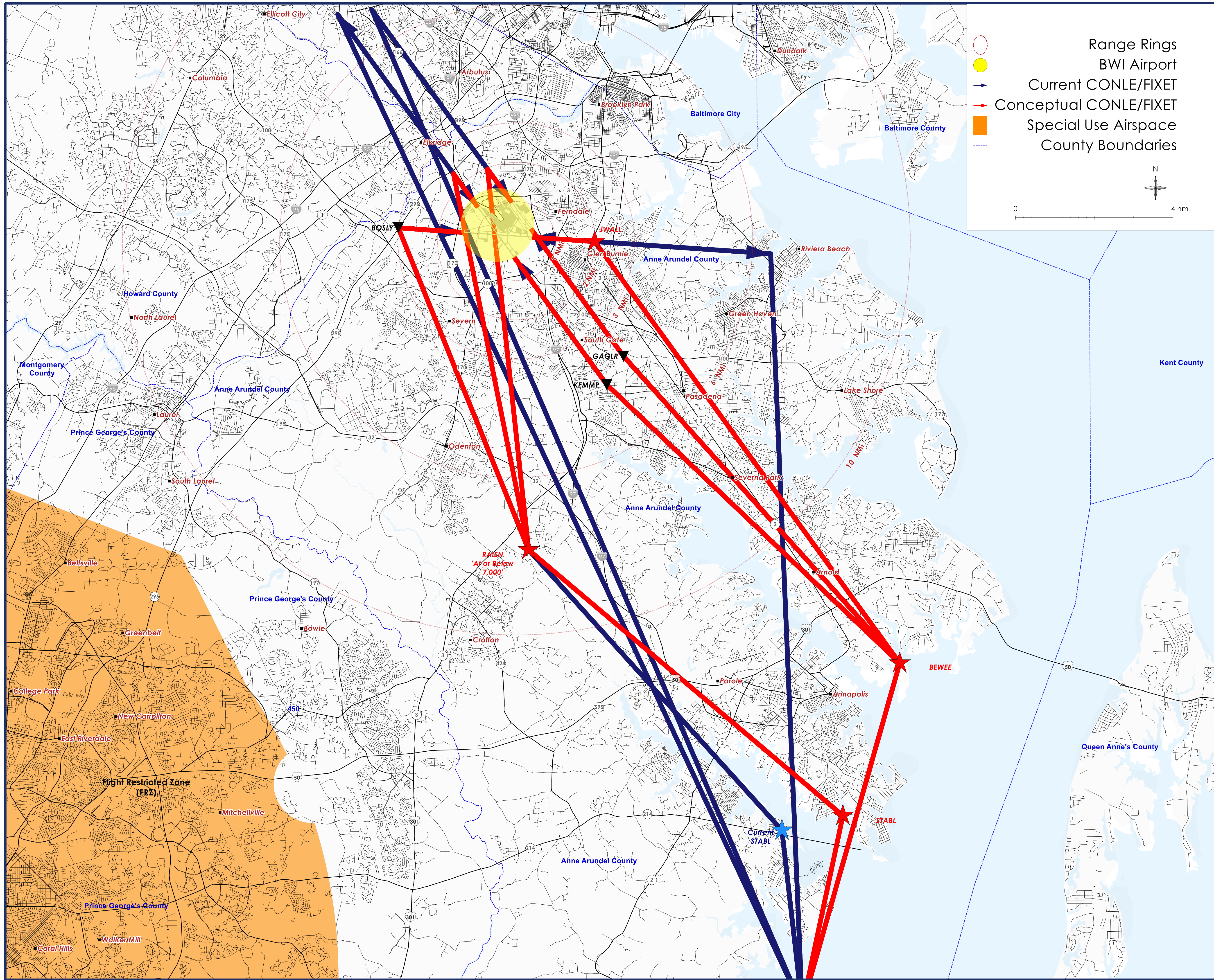
- **Conceptual CONLE**  
Serves jet departures to the south
- **Conceptual FIXET**  
Serves jet departures to the west and southwest during inclement weather events
- **No changes to departures off RWY 15L/R**
  - ✓ Usage: 29.1% (37,171 flights/year)
- **Runway 10 Usage:**
  - ✓ 0.5% (606 flights/year)
- **Runway 10 Changes:**
  - ✓ **Current** – Depart heading 105 with RADAR vectors to OHSS
  - ✓ **Conceptual** - JWALL added 1 nm from end of RWY 10 for conformance with voluntary noise abatement procedures and to utilize climb via
  - ✓ After JWALL procedure goes direct BEWEE, direct OHSS

# BWI CONLE/FIXET RNAV SID (Departure)



- **Runway 28 Usage:**
  - ✓ 63.4% (81,023 flights/year)
- **Runways 33L/R Usage:**
  - ✓ 7.1% (9,043 flights/year)
- **Runways 28 and 33L/R Changes:**
  - ✓ Altitude restriction 'At or Below 7,000' ft added at RAISN for climb via clearance
  - ✓ STABL moved 1.59 nm east for criteria
- Pre-Metroplex tracks (Feb 2012)
- **Current tracks (Feb 2017)**

# BWI CONLE/FIXET RNAV SIDs (Departures)



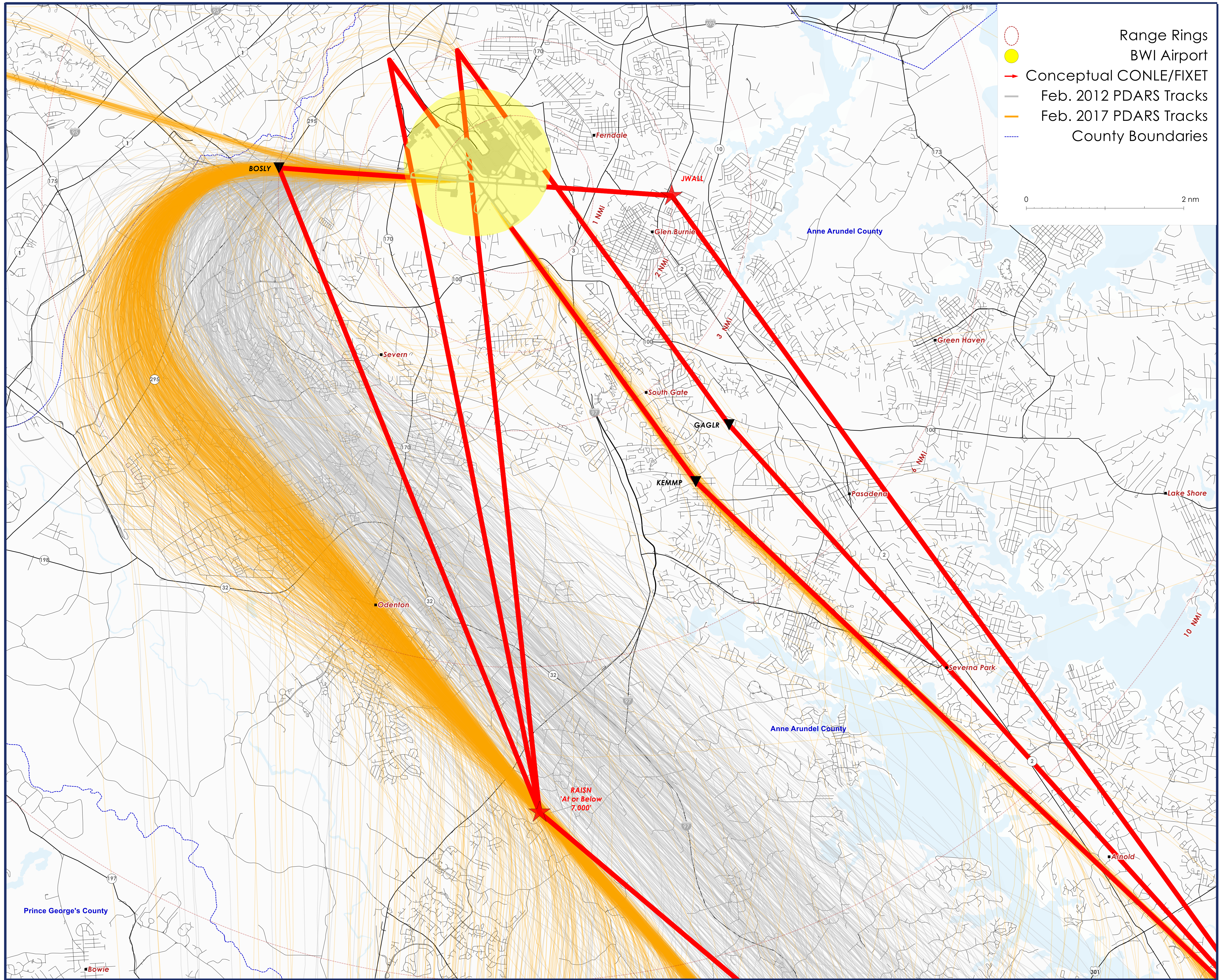
- CONLE - Serves jet departures to the south
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2017 Departure Runway Usage

Runway	Percent Usage	Operation Counts
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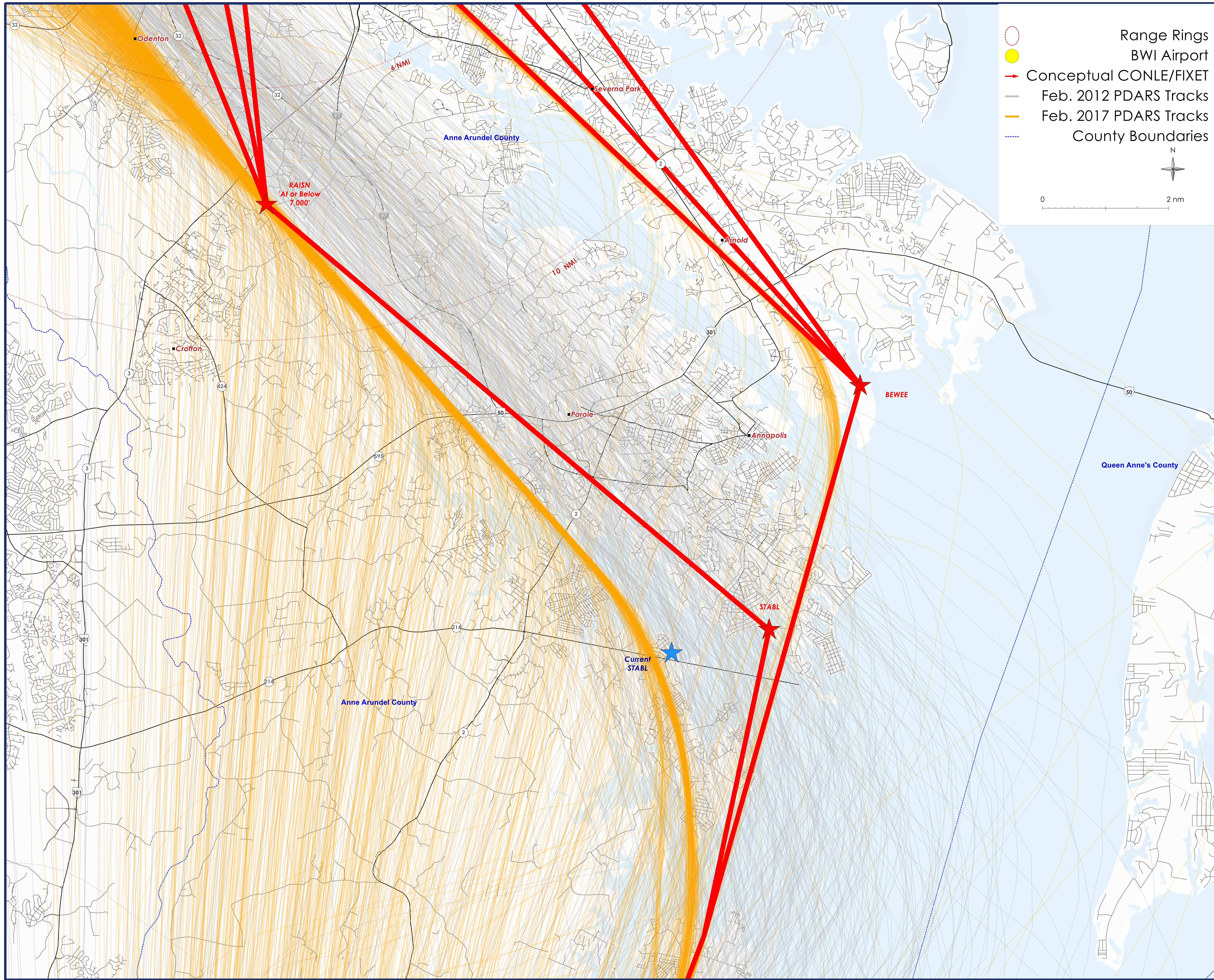
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- No changes to departures off RWY 15L/R
- RWY 28 & 33L/R Changes:
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- Runway 10 Changes:
  - JWALL added 1 nm from end of RWY 10 for conformance with voluntary noise abatement plan and to utilize climb via



# BWI CONLE/FIXET RNAV SIDs (Departures)



○ Range Rings  
● BWI Airport  
→ Conceptual CONLE/FIXET  
— Feb. 2012 PDARS Tracks  
— Feb. 2017 PDARS Tracks  
- - - County Boundaries

N

0                      2 nm

- RWY 28 & 33L/R Changes:
  - Altitude restriction 'At or Below 7,000' ft added at RAISN for climb via clearance
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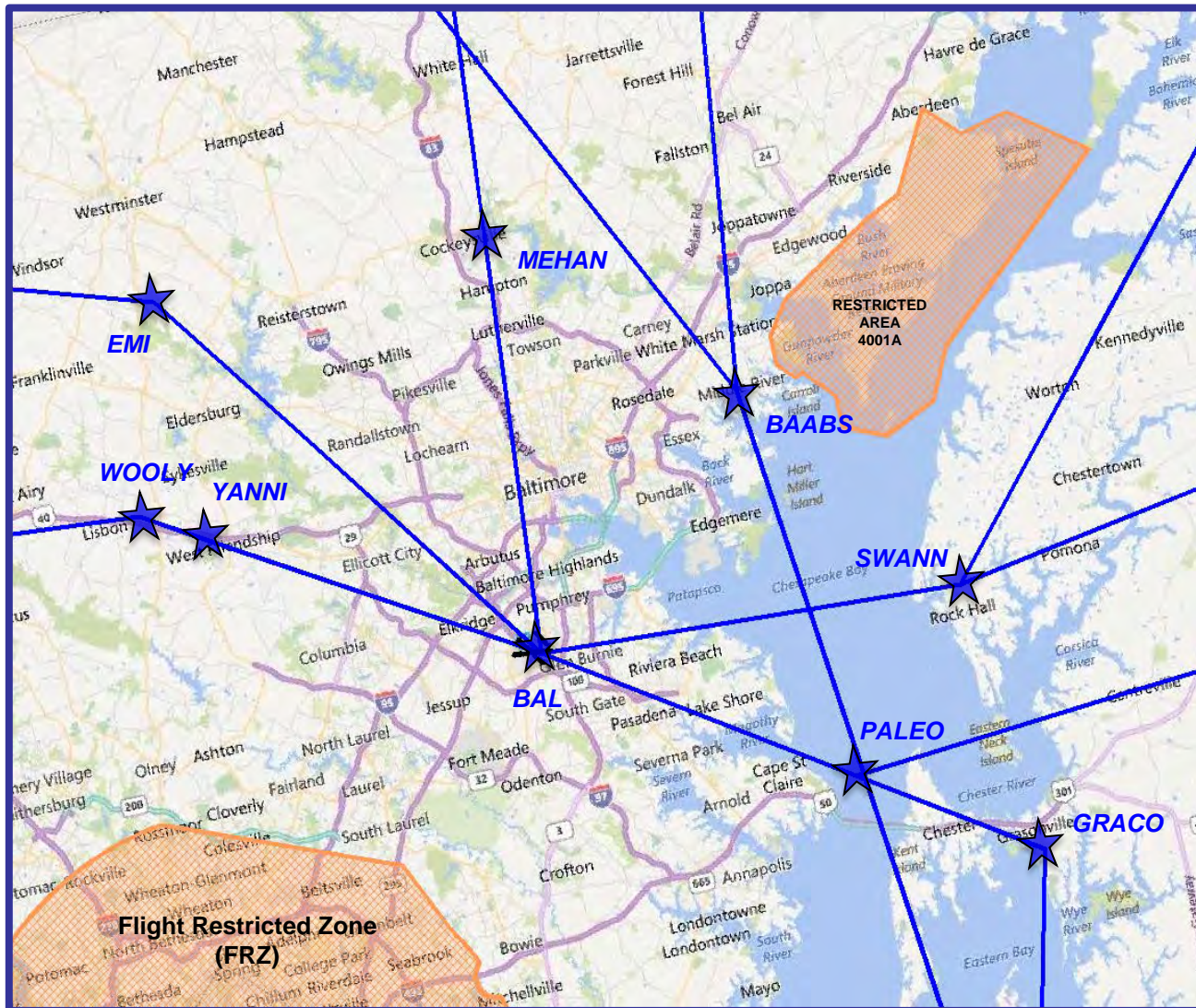


# RNAV Terminal Transition Routes (T-Routes)

## ❖ T-Routes vs. Victor Airways

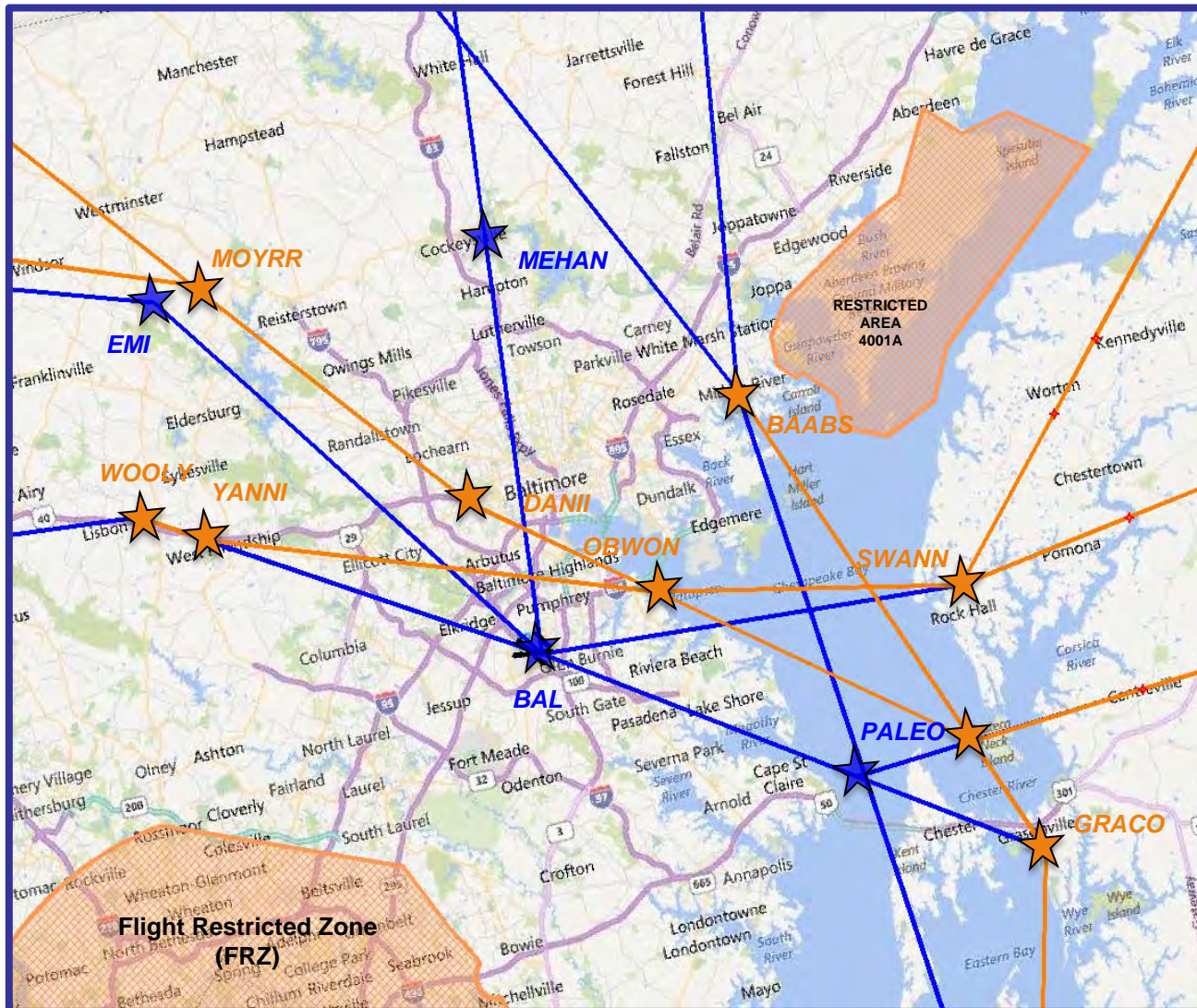
- Victor airways are legacy routes utilizing ground-based navigation
  - Current victor airways fly over BAL VOR and limit the ability to utilize climb via procedures for the BWI departures
  - Most Victor airways in the BWI area are expected to be removed
- Modern T-Routes utilize satellite-based navigation and provide more efficient routing for aircraft at or below 17,000 feet
  - Conceptual routes T-356, T-358 will be built and T287 will be modified to deconflict overflight traffic from BWI arrivals and departures
  - T-Routes are necessary due to restricted airspace in the DC metro area (FRZ, R4001, etc...)

# Current Airways in BWI Area



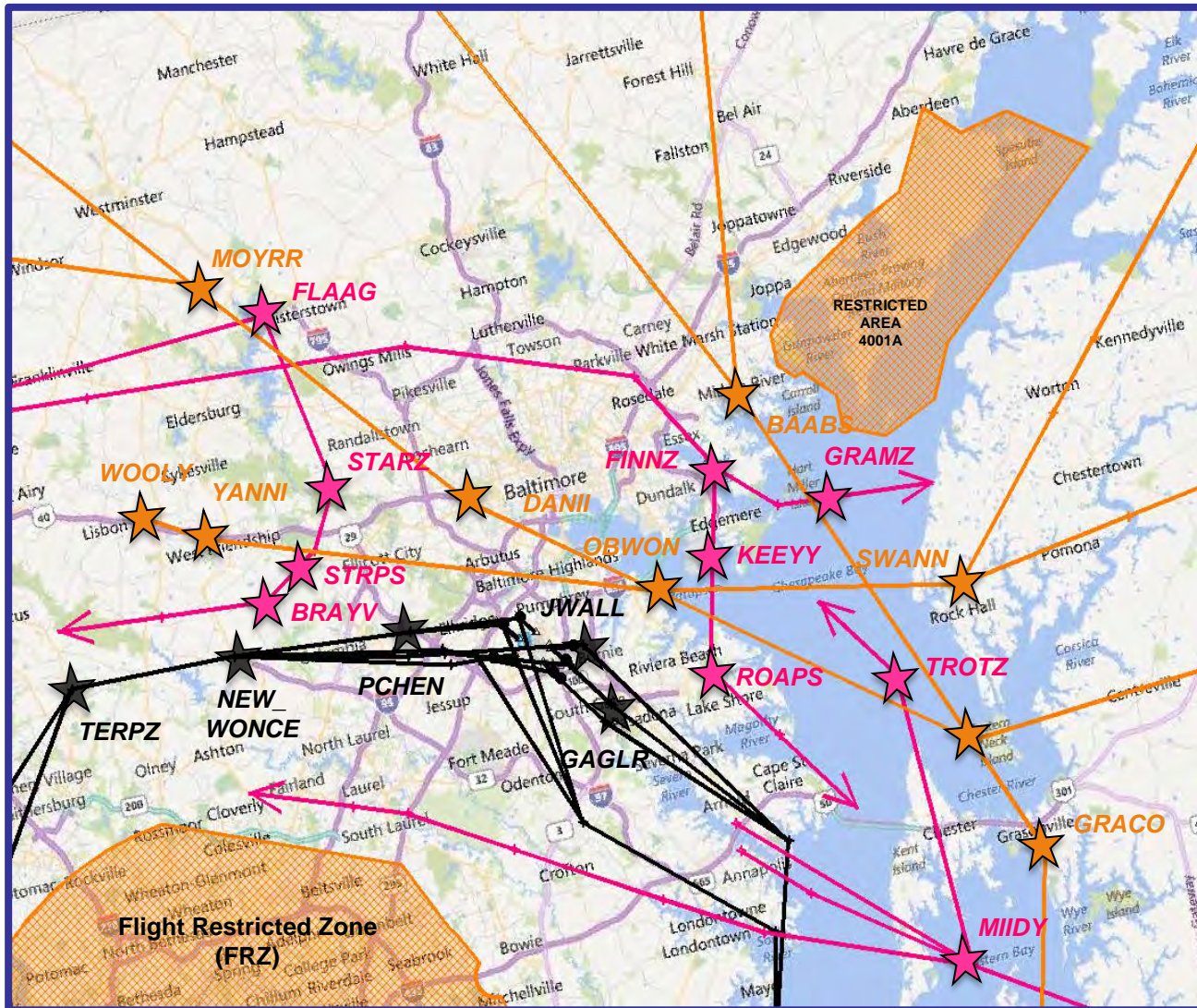
- Current airways (Victor and T's) in BWI area

# Conceptual T-Routes and Airways in BWI Area



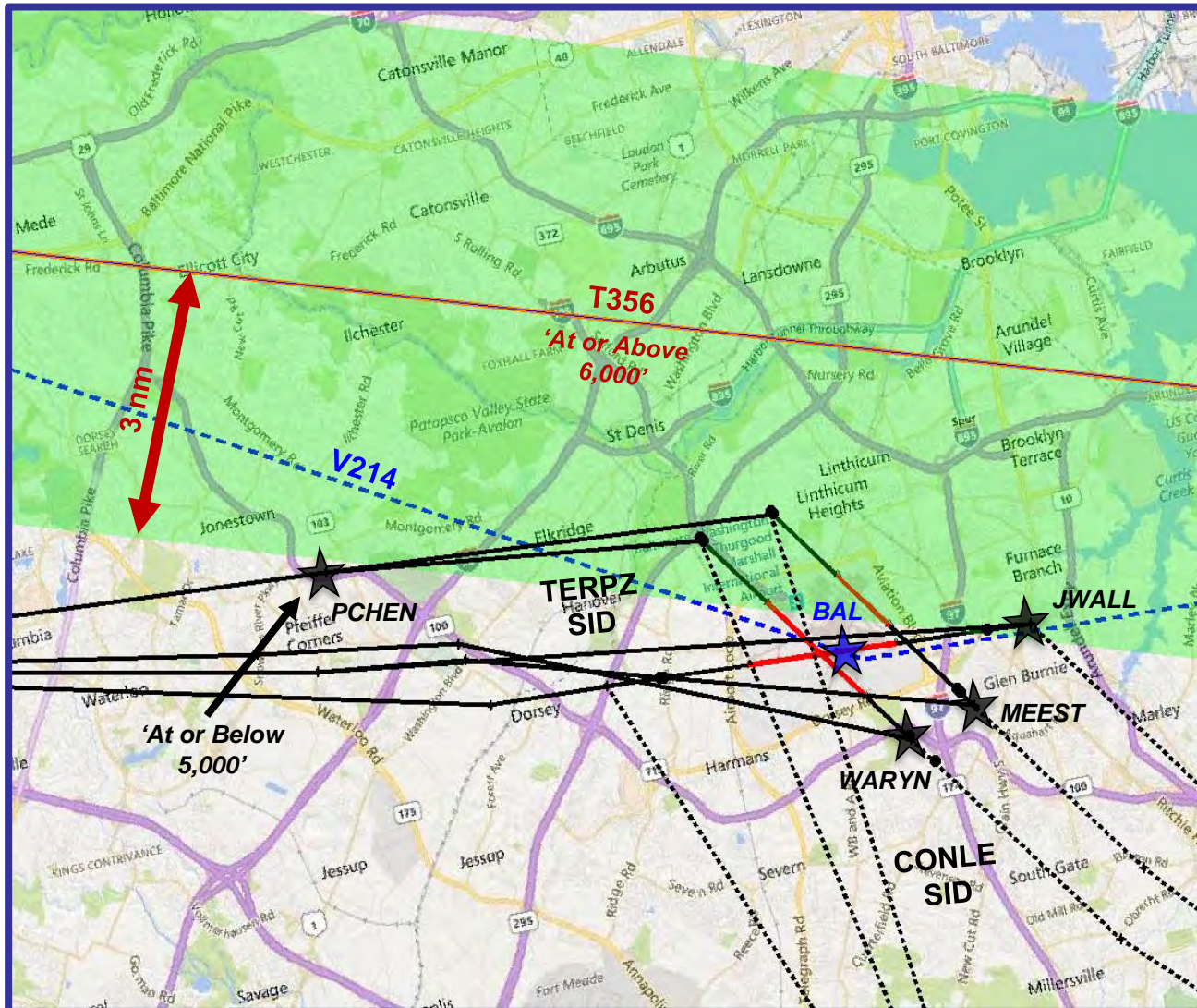
- Current airways (Victor and T's) in BWI area
- Conceptual new and amended T-Route structure

# Conceptual T-Routes



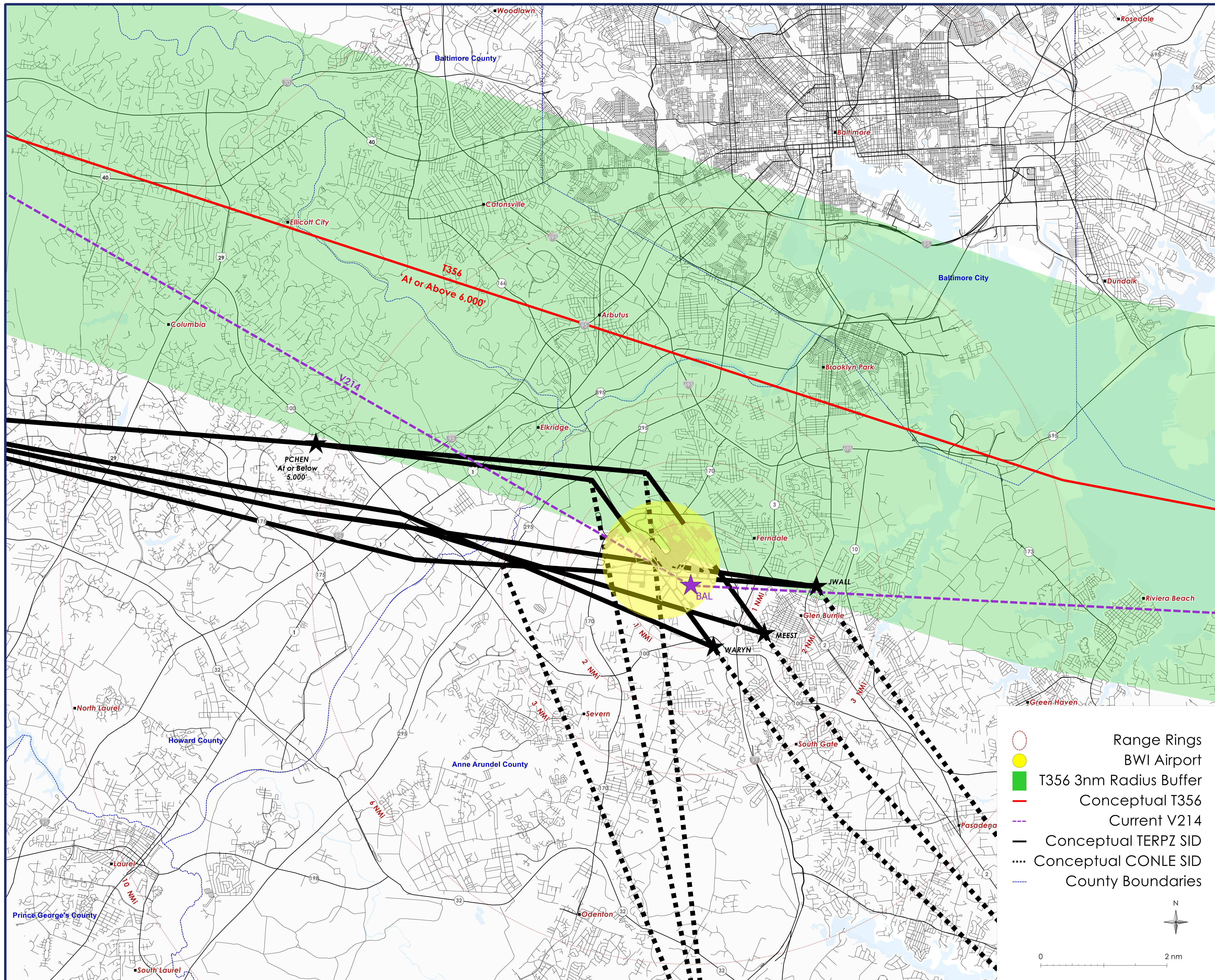
- Conceptual new and amended T-Route structure
- STARs
- SIDs

# T-Route 356



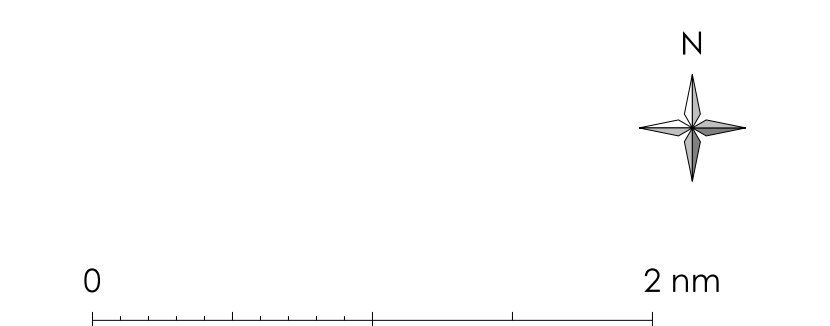
- T356 will allow BWI Tower to issue a Climb Via clearance
- Climb Via clearance allows for a pre-determined, repeatable, and efficient climb
- Currently, Runway 33L/R departures climb to 4,000 ft and level off
- Conceptual procedure will allow for a Climb Via clearance to 14,000 ft

# T-Route 356



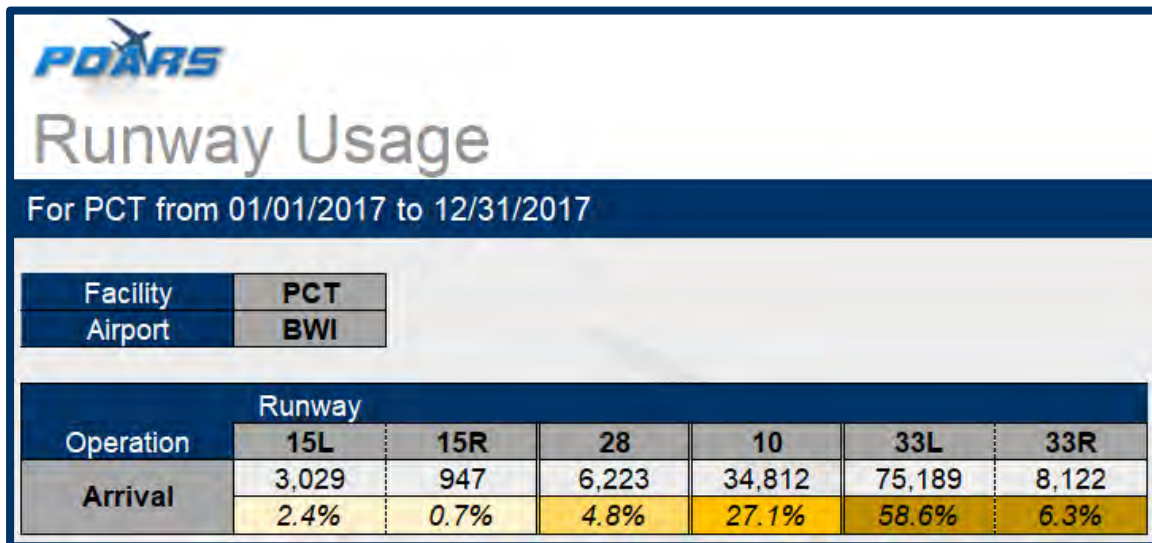
- T356 will allow BWI Tower to issue a Climb Via clearance
- Climb Via clearance allows for a pre-determined, repeatable, and efficient climb
- Currently, Runway 33L/R departures climb to 4,000 ft and level off
- Conceptual procedure will allow for a Climb Via clearance to 14,000 ft

○ Range Rings  
 BWI Airport  
 T356 3nm Radius Buffer  
— Conceptual T356  
— Current V214  
— Conceptual TERPZ SID  
— Conceptual CONLE SID  
— County Boundaries



# Standard Terminal Arrivals (STAR)

## ❖ Runway Usage



PDARS  
Runway Usage  
For PCT from 01/01/2017 to 12/31/2017

Facility	PCT
Airport	BWI

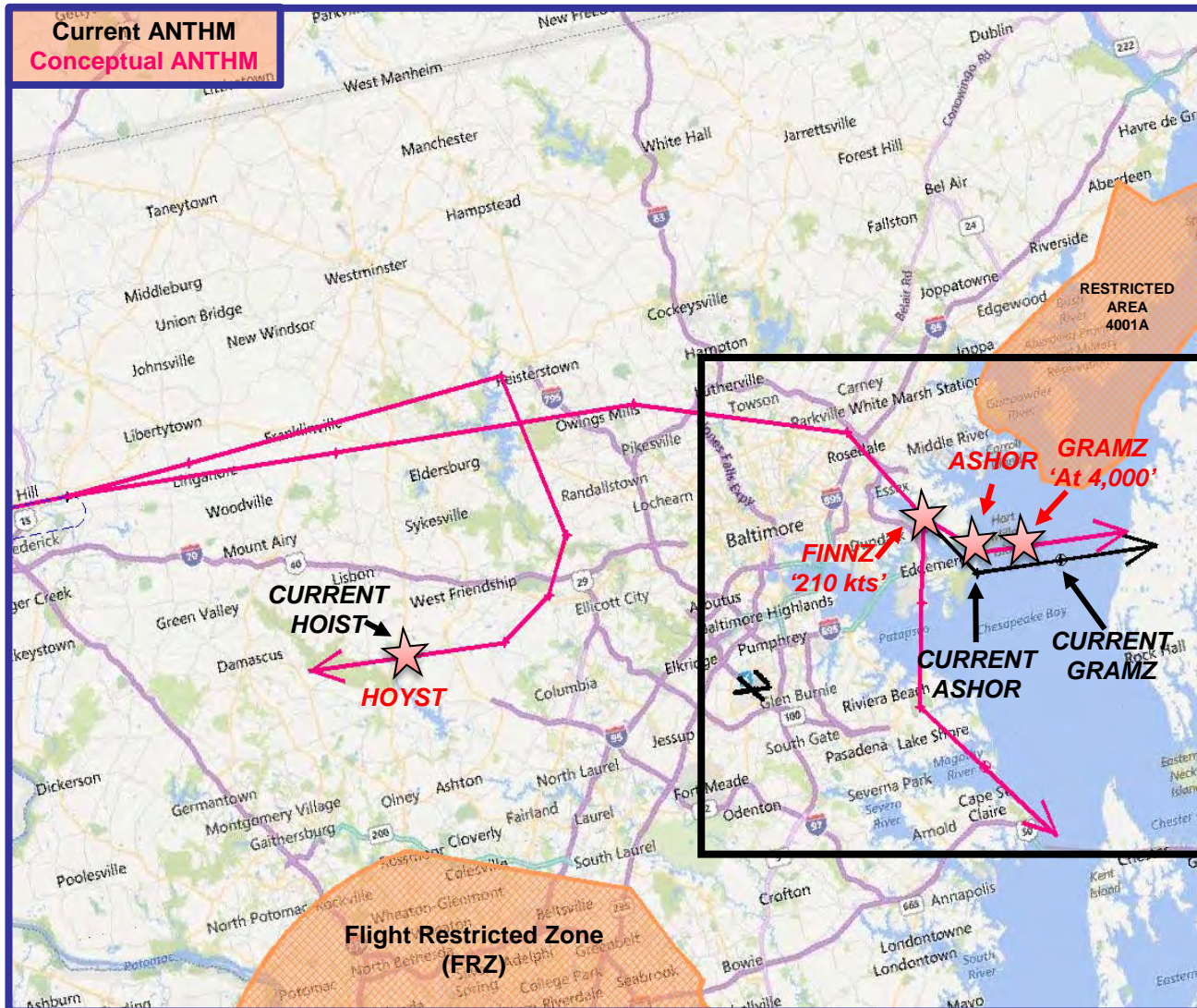
Operation	Runway					
	15L	15R	28	10	33L	33R
Arrival	3,029	947	6,223	34,812	75,189	8,122
	2.4%	0.7%	4.8%	27.1%	58.6%	6.3%

## ❖ Descend Via

- De-Conflict Traffic
- Reduce Level Offs

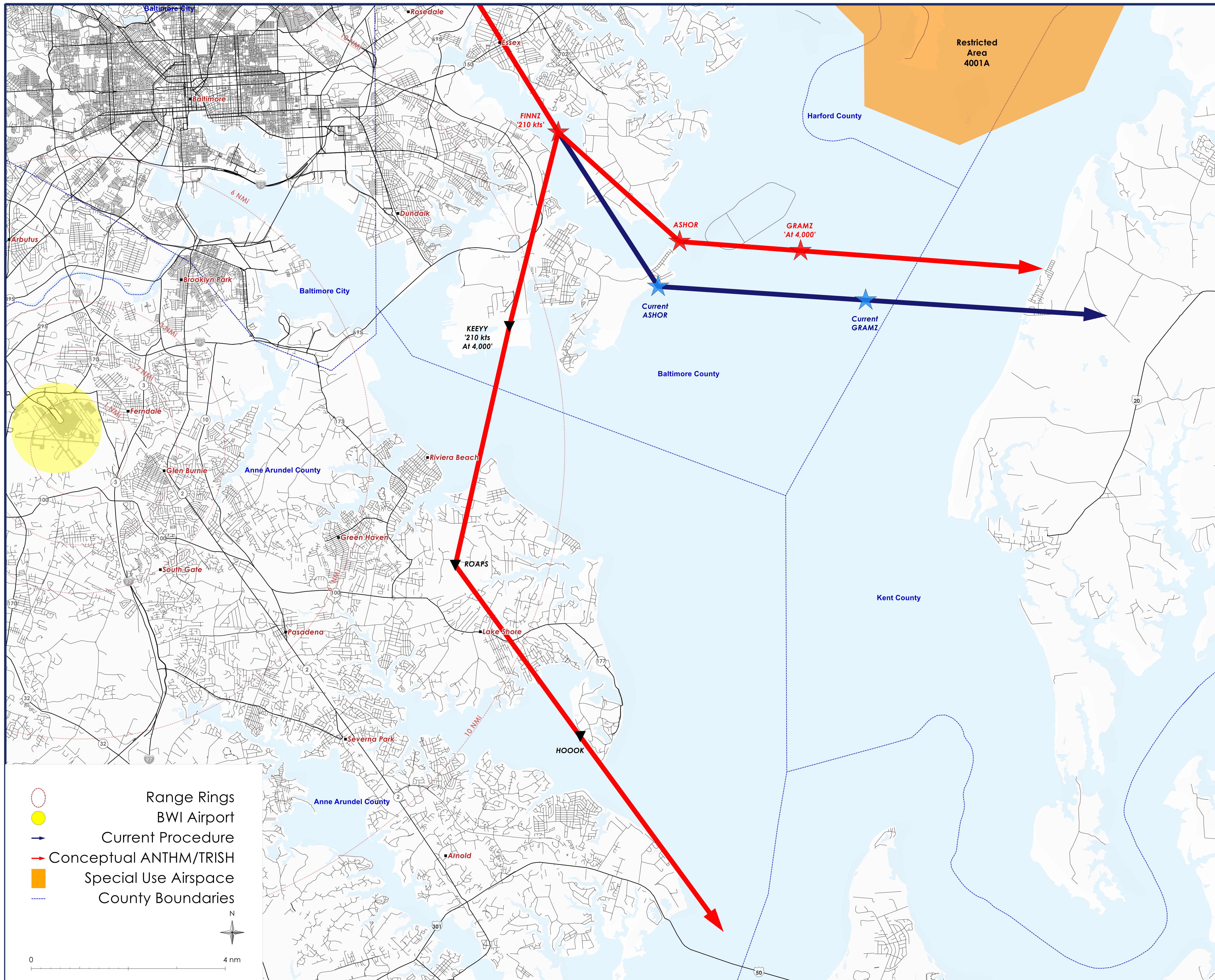
## ❖ Changes Based on Criteria and/or Safety Concerns

# BWI ANTHM RNAV STAR (Arrival)



- Serves jet arrivals from the west
- Runway 28 Usage:
  - ✓ 4.8% (6,223 flights/year)
- Spelling change – HOIST to HOYST
- Runway 28 Changes:
  - ✓ Added 210 kts speed restriction at FINNZ for criteria
  - ✓ Moved ASHOR and GRAMZ 0.9 nm north to provide a 4-mile downwind to RWY 28
  - ✓ Moved 4,000 ft altitude restriction from ASHOR to GRAMZ for criteria

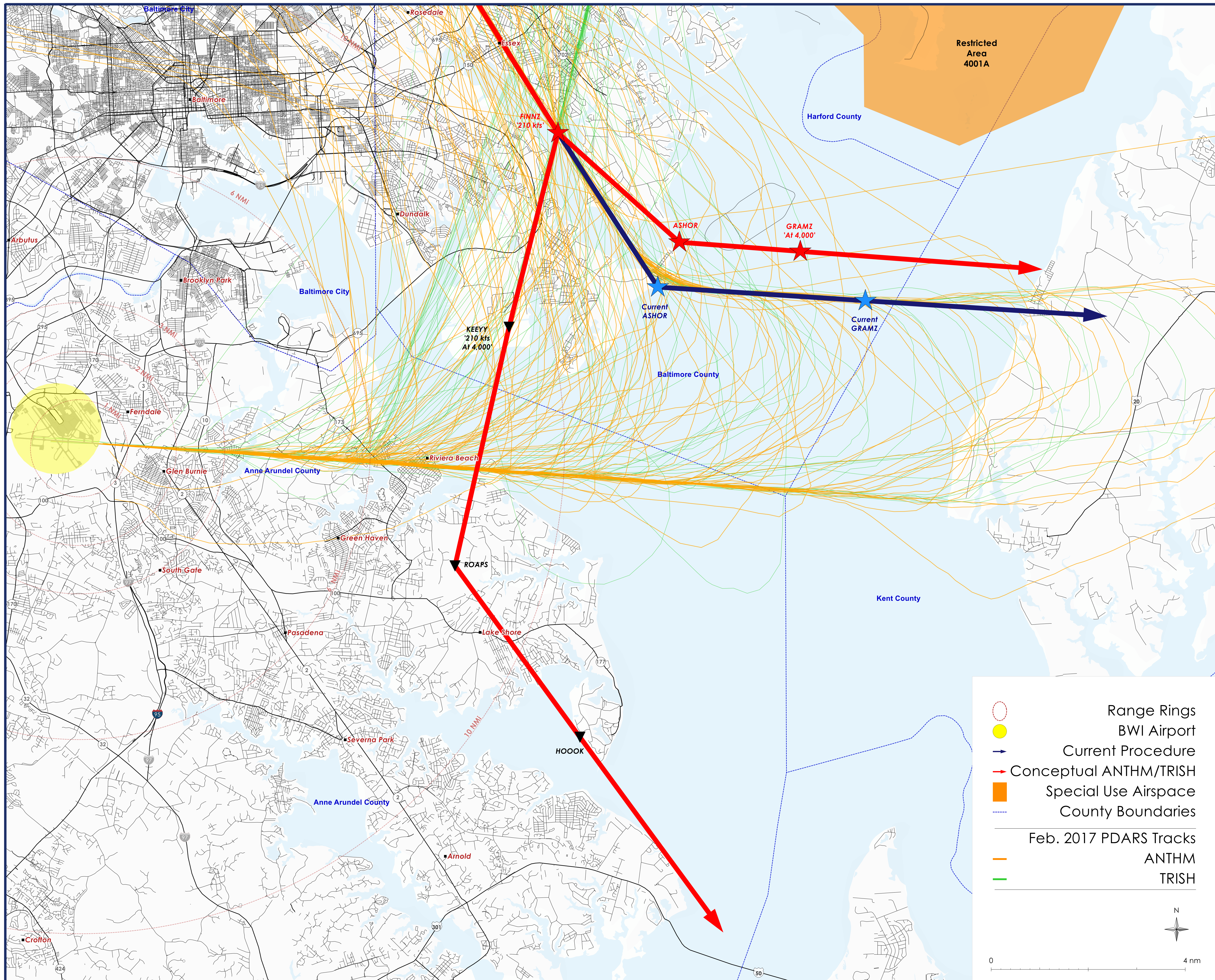
# BWI ANTHM/TRISH RNAV STARs RWY 28 Arrivals



- ANTHM  
Serves jet arrivals from the west
- TRISH  
Serves jet arrivals from the north
- Runway 28 Usage:
  - 4.8% (6,223 flights/year)
- Runway 28 Changes:
  - Added 210 kts speed restriction at FINNZ for criteria
  - Moved ASHOR and GRAMZ 0.9 nm north to provide a 4-mile downwind to RWY 28
  - Moved 4,000 ft altitude restriction from ASHOR to GRAMZ for criteria



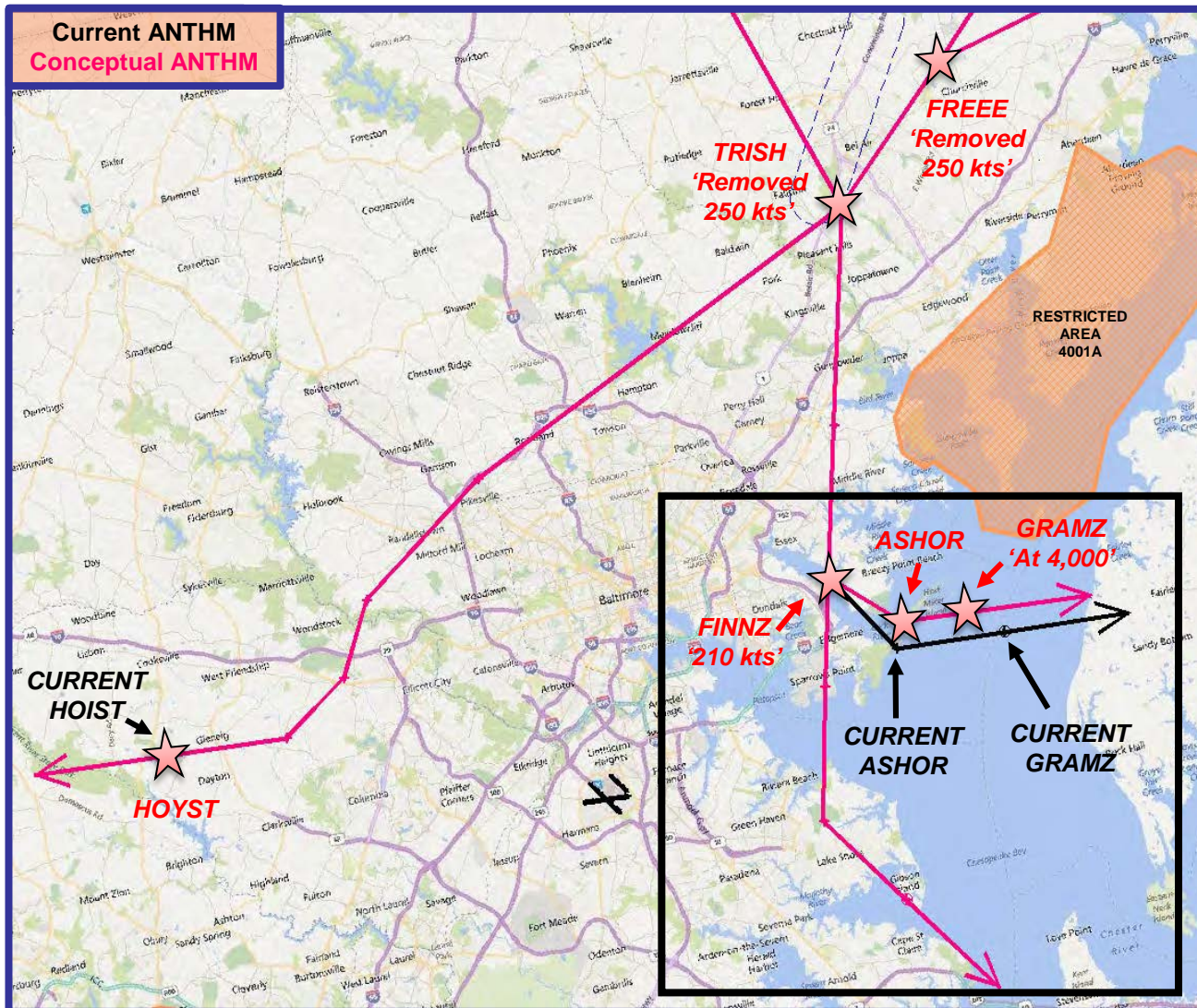
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Serves jet arrivals from the west
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Serves jet arrivals from the north
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  - Added 210 kts speed restriction at FINNZ for criteria
  - Moved ASHOR and GRAMZ 0.9 nm north to provide a 4-mile downwind to RWY 28
  - Moved 4,000 ft altitude restriction from ASHOR to GRAMZ for criteria

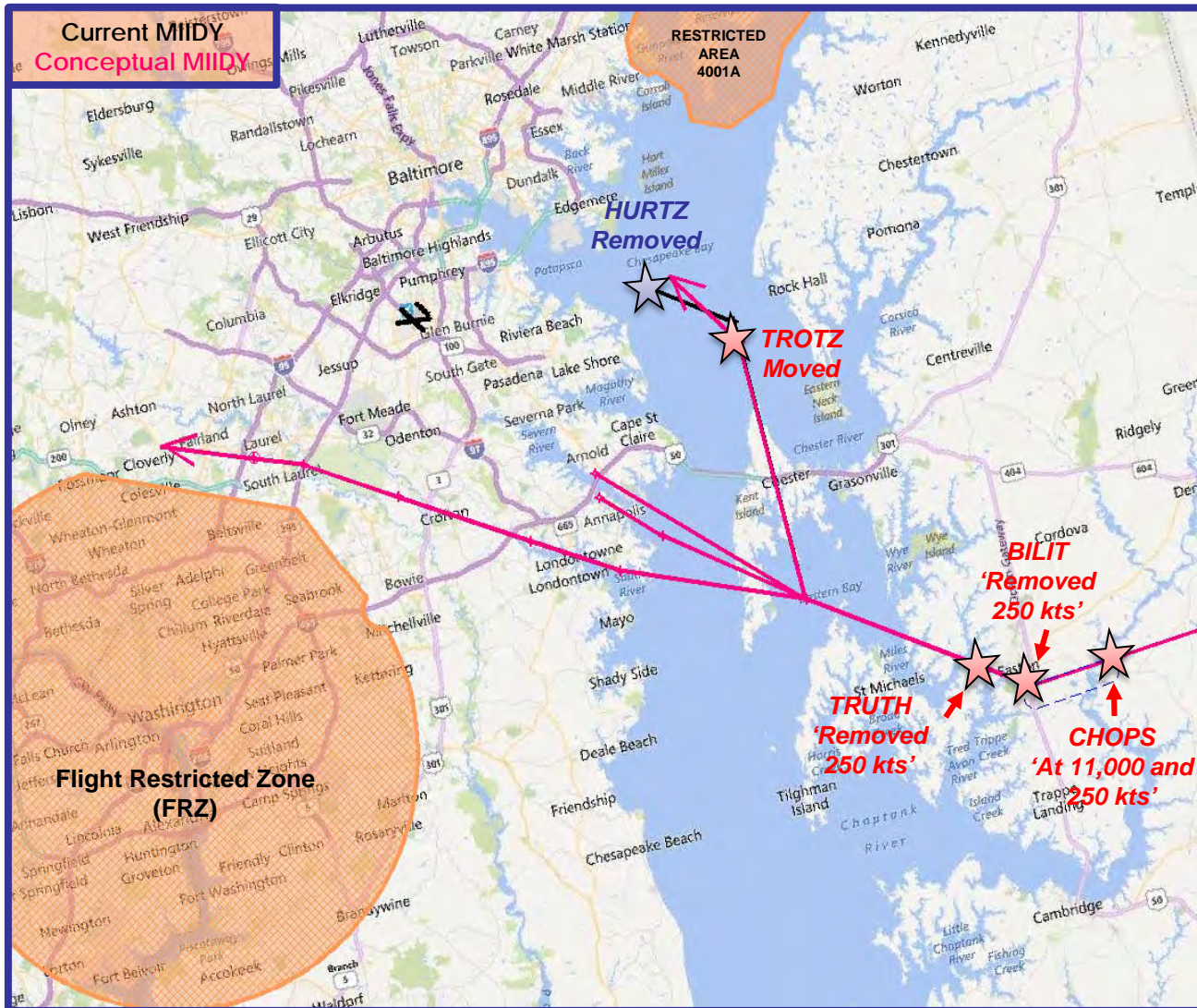


# BWI TRISH RNAV STAR (Arrival)



- Serves jet arrivals from north
- Runway 28 Usage:
  - ✓ 4.8% (6,223 flights/year)
- Spelling change – HOIST to HOYST
- Runway 28 Changes:
  - ✓ Added 210 kts speed restriction at FINNZ for criteria
  - ✓ Moved ASHOR and GRAMZ 0.9 nm north to provide a 4-mile downwind to RWY 28
  - ✓ Moved 4,000 ft altitude restriction from ASHOR to GRAMZ for criteria
- Removed 250 kts speed restriction at FREE and TRISH for criteria

# BWI MIIDY RNAV STAR (Arrival)



- Serves jet arrivals from the southeast
- Runway 28 Usage:
  - ✓ 4.8% (6,223 flights/year)
- Added 11,000 ft and 250 kts speed restriction at CHOPS to match existing agreements between Washington Air Route Center (ZDC) and Potomac TRACON (PCT)
- Removed 250 kts speed restrictions from BILIT and TRUTH to avoid redundancy
- Runway 28 Changes:
  - ✓ Removed HURTZ
  - ✓ Moved TROTZ 1 nm southeast to help with RWY28 sequencing

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# Next Steps

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## ❖ RT Recommendation Changes

- Earliest possible implementation – Late 2019 / Early 2020
  - Moving forward, the FAA anticipates questions and comments, and will review input received on these conceptual designs
  - Written response from the BWI RT indicating its position on the conceptual procedure changes (those based on their recommendation) is preferred before proceeding with Environmental/Safety Review (18-month process)
  - The BWI RT response should be submitted to the MAA which will forward to the FAA's Eastern Regional Administrator's office within 60 days (June 25, 2018) to help meet anticipated implementation

## ❖ Criteria-Related (Code) Changes

## ❖ Environmental Review

- Community involvement

## ❖ FAA Safety Approval

## ❖ Revisit Procedures if Changes are Required Based on Review

- FAA will reconvene the 7100.41 PBN FWG to discuss changes and will re-brief the MAA Roundtable



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# Roundtable Questions

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# Five Work Stations

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## ❖ Departures (2)

- CONLE/FIXET – Matt Fisher
- TERPZ/LINSE – Nick Johnson

## ❖ Arrivals (1)

- ANTHM/TRISH – Bryan Lehman

## ❖ T-Routes (1)

- Jesse Moyer

## ❖ Environmental (1)

- Aaron Braswell and Sean Doyle

- Legend
- BWI Arrivals —
- BWI Departures —
- DCA Arrivals —
- DCA Departures —
- IAD Arrivals —
- IAD Departures —

- *BWI/IAD/DCA North Flow*
- *Arrivals and Departures*
- *August 19, 2016*
- *24 Hours / 2,379 Flights*

