

APPENDIX E

Air Cargo Alternatives

- Preliminary Alternatives
- Interim Phase

Preliminary Cargo Alternatives

This report provides cargo area expansion alternatives for mainline and “feeder” operations at Sioux Falls Regional Airport (FSD).

Cargo Considerations

Information gathered as part of the ongoing Master Plan / Airport Layout Plan Update indicates circumstances that have changed since the prior Master Plan:

- The number of feeder aircraft utilizing the East GA and East Cargo Apron is significantly lower since UPS relocated North Dakota feeder service to Hector International Airport (FAR). Use of the East Cargo Apron for each mainline UPS operation typically includes five to seven Beech 1900s (Alpine Air Express) and one Fairchild Metroliner (Encore Air Cargo). Encore parks smaller twin-engine aircraft on the East GA Apron.
- Cargo operations at UPS and FedEx have continued to increase and operational challenges with UPS’ off-apron cargo facility have been increasing as well.
- Amazon Air and other cargo operators may wish to operate at FSD during the planning period. Considering their potential space needs and balancing those needs with the needs of existing operators is important.

Recommended East Cargo development concepts from the prior Master Plan were depicted in “Exhibit 5-7” of that document. A portion of Exhibit 5-7 is shown below (**Figure 1**).

Figure 1: Prior Master Plan – Recommended East Cargo Development Concepts (South)



Source: FSD 2013 Master Plan (KLJ)

Preliminary Alternatives Overview

This section provides the following:

- Baseline of existing East Cargo Area facilities
- Cargo expansion alternatives divided into three areas:
 - North Expansion Alternatives (FedEx)
 - South Expansion Alternatives
 - UPS Mainline / Potential Additions (ex. Amazon)
 - UPS Cargo Feeders (Temporary & Long-Term Alternatives)
 - Northwest Development Cargo Alternatives

East Cargo expansion alternatives include the recommended concept from the prior master plan. Alternatives for the “north” and “south” areas were separated for ease of discussion. The northwest development alternatives provide basic airside and landside facility layouts for potential cargo operations in developable space to the northwest of the West GA Area.

East Cargo Facilities Baseline

North (FedEx) and South (UPS) facilities are depicted in **Figures 2** and **3**, respectively. Aircraft added to the figures provide a general portrayal of existing facilities and aircraft parking configurations for both areas of the East Cargo Apron.





East Cargo Area Expansion Alternatives

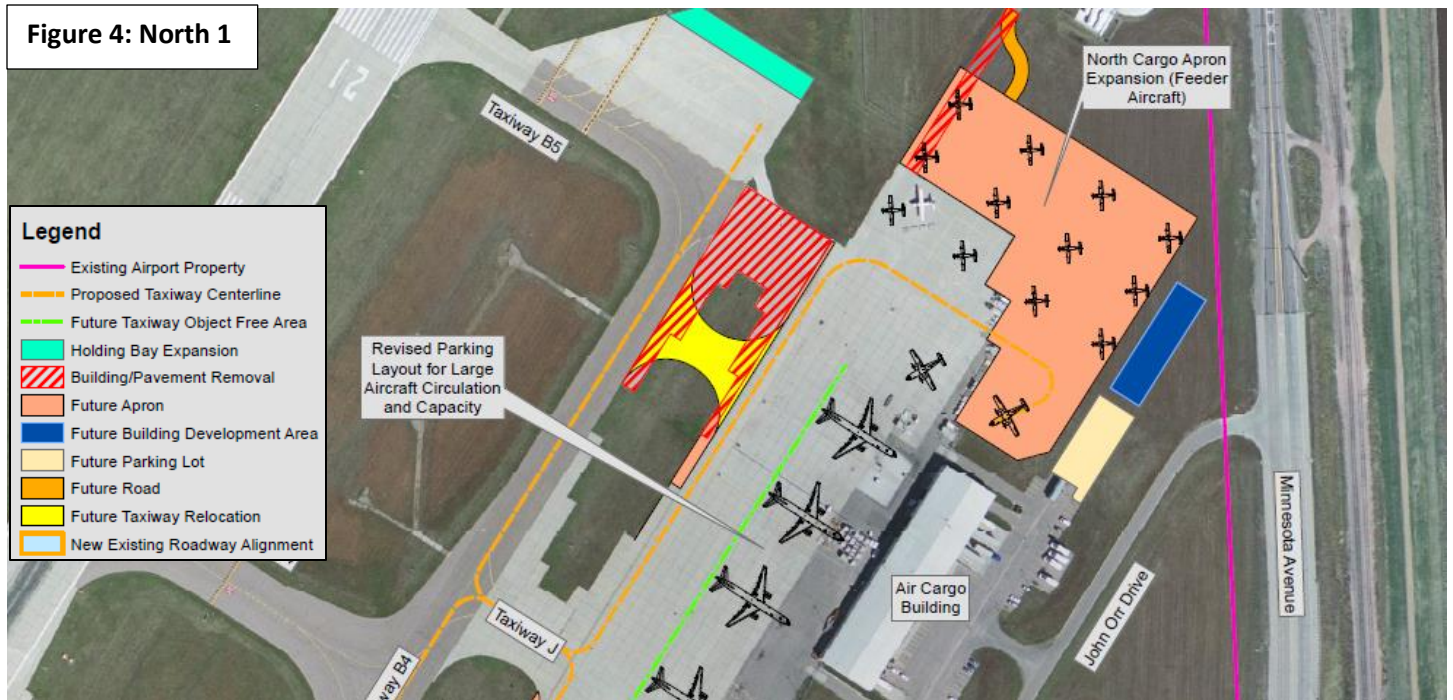
North Alternative Overview

North 1 (**Figure 4**) carries forward the recommended north area development concept from the prior Master Plan. This alternative primarily serves as a baseline for comparison. Changing circumstances at FSD over the last five years and direct feedback from FedEx were incorporated into development of North 2 (**Figure 5**). FedEx indicated their current building and apron facilities are adequate for existing operations. If FedEx needs to expand their building in the future, a building footprint of roughly 50,000 square feet (sf) would likely be required to accommodate the next upgauge in sort facility. The southern side of the building FedEx occupies is currently used by Same Day Express and could not be easily retrofitted to fit FedEx's needs. Even if this were a favorable option, it would still leave FedEx 10,000 sf short of the necessary space.

FedEx indicated Boeing 767F aircraft would be the appropriate critical aircraft for which to plan. They also indicated they will soon be replacing some Cessna Caravans with Cessna SkyCouriers and they expect to continue using ATR-42s and ATR-72s.

North 1

North 1 does not provide an adequate cargo building footprint to accommodate a potential 50,000 s.f. sort facility uppgage. The separate, smaller facility shown in blue in **Figure 4** would not meet FedEx's needs.

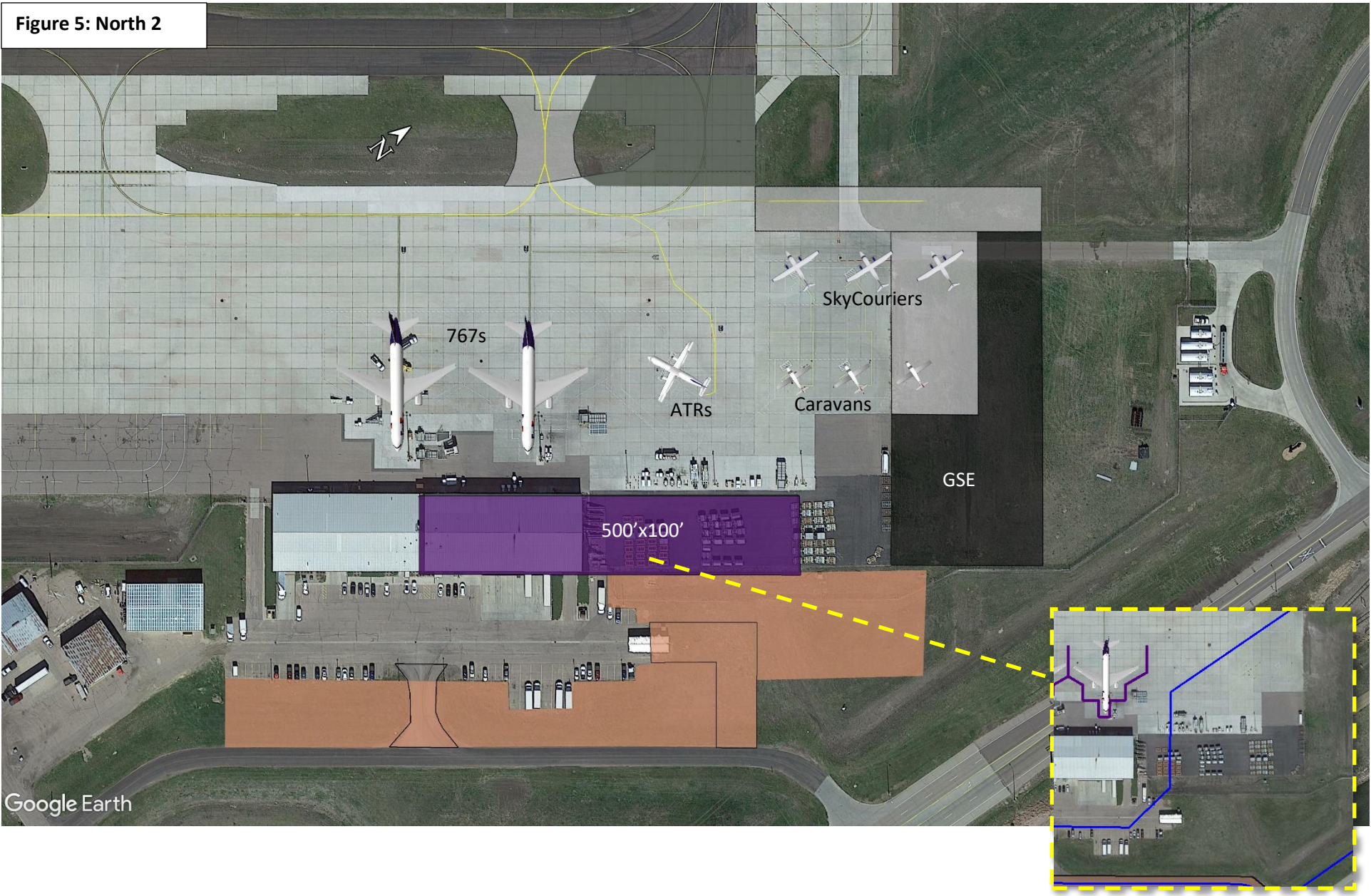


Source: FSD 2013 Master Plan (KLJ)

North 2

North 2 (**Figure 5**) incorporates input received from local and corporate FedEx staff. FedEx indicated northward expansion should accommodate their needs. Access road alternatives subsequently developed may require adjustments to proposed FedEx access and parking expansion. Expansion of the existing FedEx building to the north may require relocating the water well line situated approximately 90 feet north of the existing FedEx facility.

Figure 5: North 2



South Alternatives Overview

Six “south” alternatives are depicted in this section. South 1 carries forward the recommended south cargo apron development concept from the prior Master Plan and primarily serves as a baseline for comparison. Alternatives plan for future scenarios where Amazon Air is based at FSD and unscheduled general freighter operations occur. South 2 and South 3 focus on maximizing efficiency of the East Cargo Apron for mainline aircraft parking. South 4, 5, and 6 place more emphasis on existing air traffic control tower (ATCT) line-of-sight (LOS) considerations. Ideally, a new tower site or taller tower would alleviate constraints for East Cargo development, but the ultimate outcome and timing are uncertain. At this phase of alternatives development, the intent is to meet general space needs. Building footprints of 350 feet by 150 feet for UPS and 220 feet by 150 feet for Amazon Air are portrayed for South 2, 3, 4, and 6; however, these could be adjusted to better accommodate facility needs as was done for South 5. A minimum landside depth of 250 feet between the back of cargo buildings and access road centerlines was planned for these alternatives, but adjustments could be made to allow for greater parking/access in certain areas with reduced parking/access in others.

South 1

South 1 (**Figure 6**) incorporates significant feeder apron construction and parking of feeder aircraft on full-strength concrete sections of existing East Cargo apron, resulting in 17 feeder aircraft parking positions. The number of feeder aircraft operating at FSD has lessened since the prior Master Plan. Alpine Air Express indicated they typically park five—and occasionally up to seven—B1900s on the East Cargo Apron for loading/unloading with UPS mainline aircraft. Encore Air Cargo typically has one Fairchild Metroliner parked on the East Cargo Apron and smaller twin-engine Cessnas parked on the East GA Apron for loading/unloading with UPS mainline aircraft. Assuming peak aircraft numbers from Alpine, this would indicate a current need to accommodate eight feeder aircraft on the East Cargo Apron for UPS operations.

Airside ground support equipment (GSE) space may be insufficient and building depth is less than the 150 feet recommended by a third-party developer. Cargo building expansions would increase impacts to existing ATCT movement area line of sight.

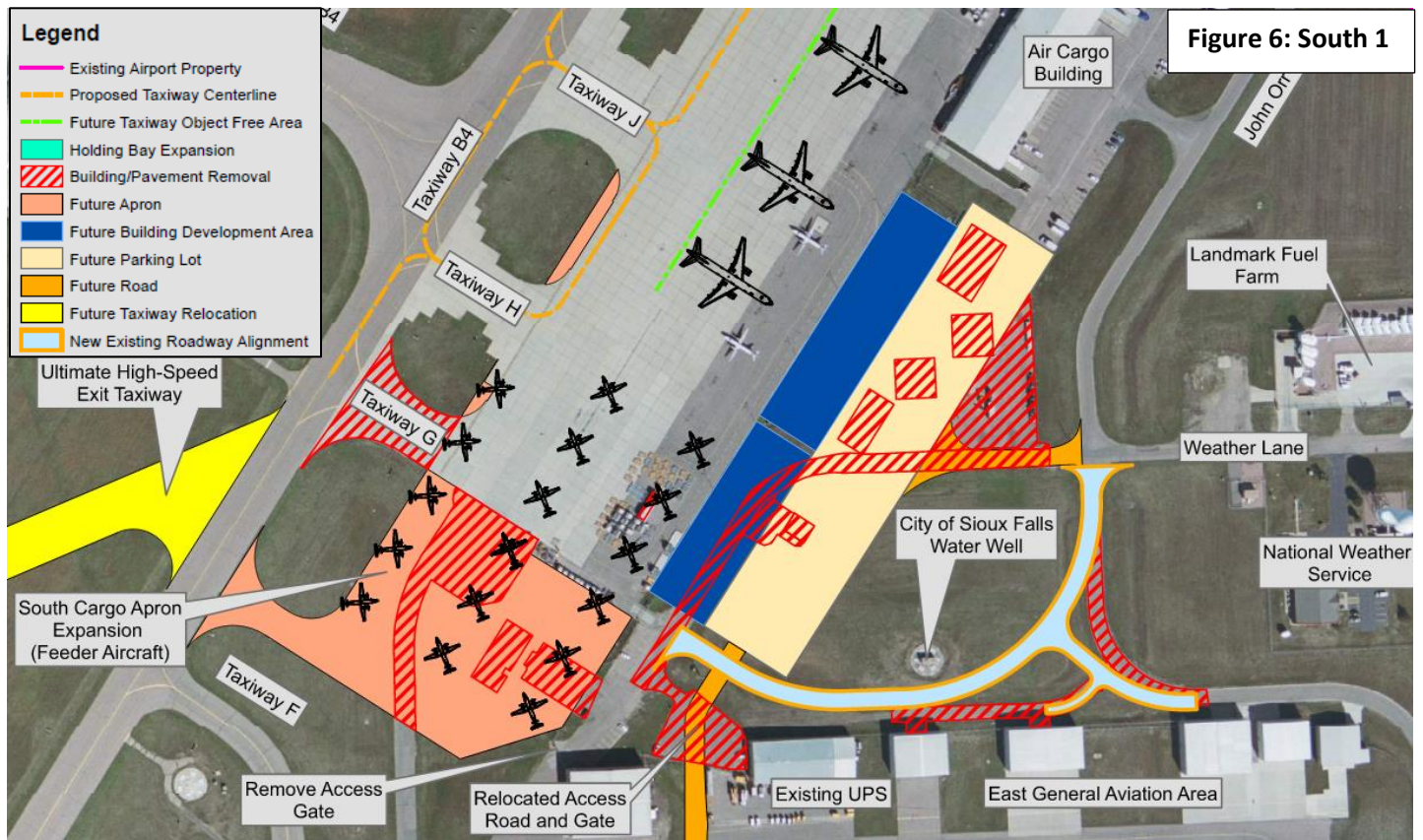


Figure 6: South 1

Source: FSD 2013 Master Plan (KLJ)

South 2

South 2 (**Figure 7**) would place future cargo buildings on the edge of the existing apron similar to the prior recommended alternative; however, the cargo building depth would be increased to 150 feet. South 2 assumes UPS mainline aircraft parking and cargo building (brown) will be located on the northern side of this area. Mainline parking positions for Amazon Air (blue) could be accommodated on the southern side as well as an additional “flex”/general cargo freighter position (black). Parking positions and building locations can be rearranged to the recommended FSD layout. The feeder alternatives section provides an alternative where feeder aircraft can utilize apron areas until they may become necessary for mainline use. Locating cargo facilities on the east edge of the apron limits available space for GSE storage and vehicle maneuvering. Also, impacts to ATCT line of sight increase as buildings and aircraft are located further to the west. Roadway relocation would help provide additional landside space, if necessary (tan/black).

South 3

South 3 (**Figure 8**) is similar to South 2, but would place future cargo buildings 100 feet east of the existing apron edge in order to provide additional space for GSE and vehicle flow on the airside of the building (tan/dark gray). There would also be minor improvements to ATCT LOS compared to South 2.

There is sufficient available space on the landside of the proposed cargo buildings to accommodate vehicle parking and maneuvering after any necessary access road relocation. South 3 assumes UPS mainline aircraft parking and cargo building (brown) will be located on the southern side of this area. Mainline parking positions for Amazon Air (blue) could be accommodated on the northern side as well as an additional “flex”/general cargo freighter position (black). Like South 2, parking positions and building locations could be swapped or rearranged to the preferred FSD positioning. Airside vehicle access is depicted in tan with white boundaries.

South 4

South 4 (**Figure 9**) locates cargo buildings outside the ATCT viewshed of movement areas (red line).¹ Larger mainline cargo aircraft (UPS 767s) are parked at an angle to reduce impacts to line of sight. Angled parking makes it difficult to fit more than three mainline parking positions in the south area of the East Cargo Apron. Shifting aircraft parking further east also requires more full-strength apron pavement (white) and construction of pavement for GSE and vehicle maneuvering (dark gray).

South 5

South 5 (**Figure 10**) prioritized minimizing impacts to ATCT line of sight. Like South 4, South 5 locates cargo buildings outside the ATCT viewshed of movement areas (red line). South 5 also locates the northernmost UPS parking position in an area where the aircraft would not impact the viewshed of movement areas. Other mainline cargo aircraft (UPS 767s and Amazon 737s) are parked at an angle to reduce impacts to line of sight. One major difference of South 5 is that the typical block shapes for UPS and Amazon Air were altered to show how the building layouts could be adjusted to avoid constraints (such as the water well near Amazon Air) and better accommodate docking access for larger trucks.

As mentioned in South 4, angled parking makes it difficult to fit more than three mainline parking positions in the south area of the East Cargo Apron. Shifting aircraft parking further east also requires more full-strength apron pavement (white) and pavement for GSE and vehicle maneuvering (dark gray).

South 6

South 6 (**Figure 11**) also prioritized minimizing impacts to ATCT line of sight. Like South 4 and 5, South 6 locates cargo buildings outside the ATCT viewshed of movement areas (red line). South 6 places cargo facilities parallel to the new access road in an attempt to maximize airside space and minimize parked aircraft impacts to LOS. South 6 would require more new apron pavement than other alternatives.

¹ Assumes southern relocation of a taxiway connector to eliminate direct access to Runway 3/21.

Figure 7: South 2



Figure 8: South 3

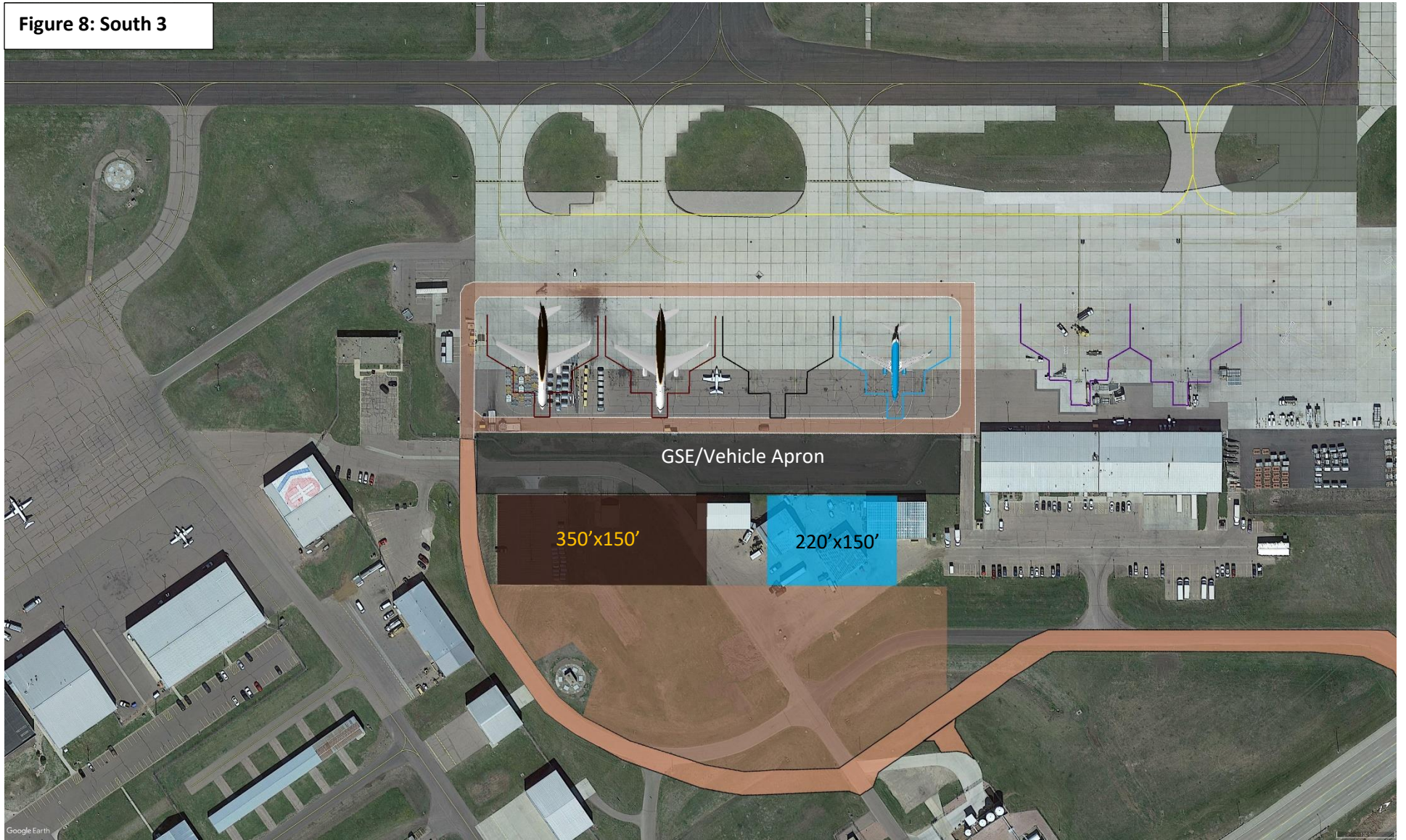


Figure 9: South 4

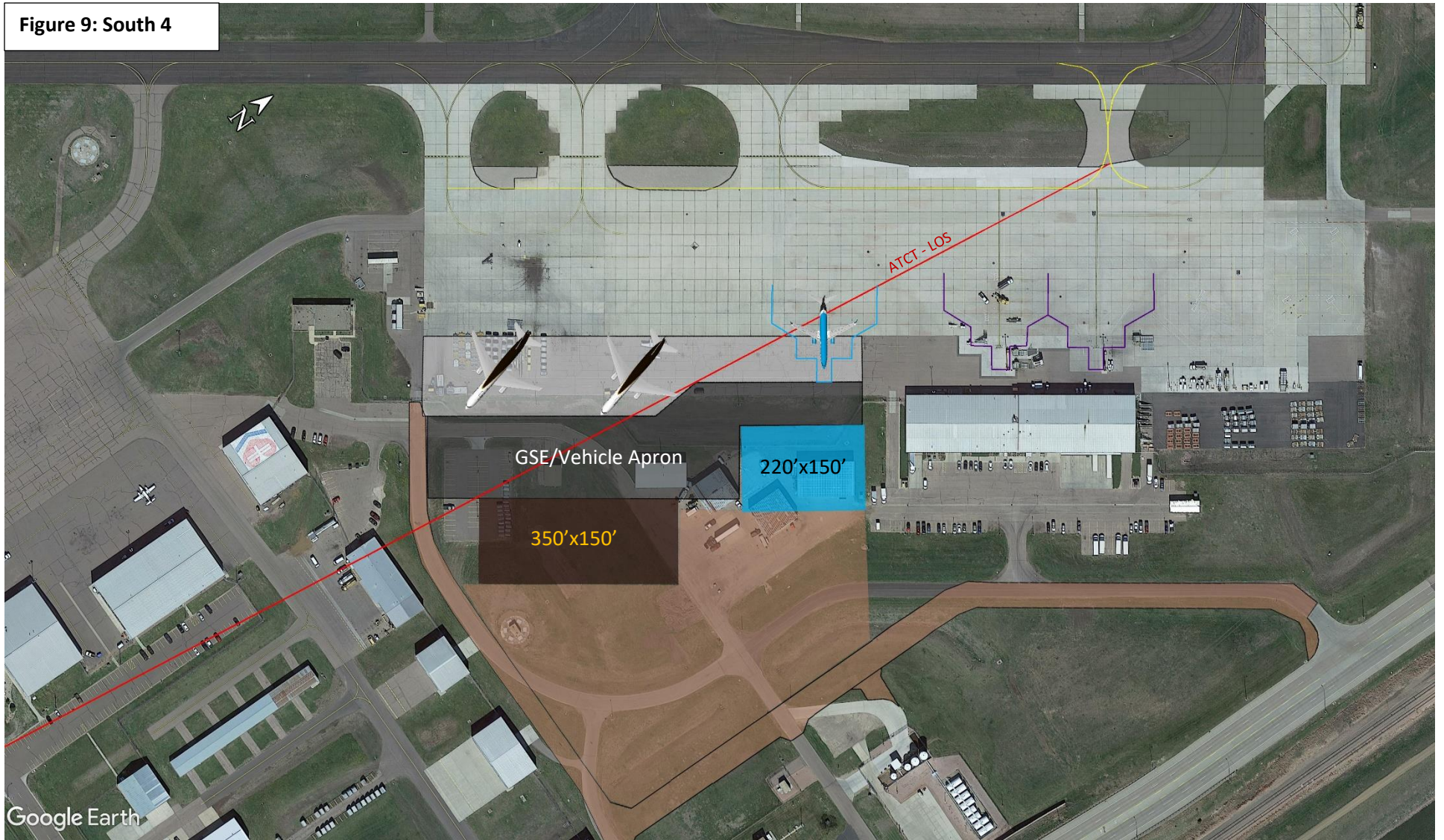


Figure 10: South 5



Figure 11: South 6

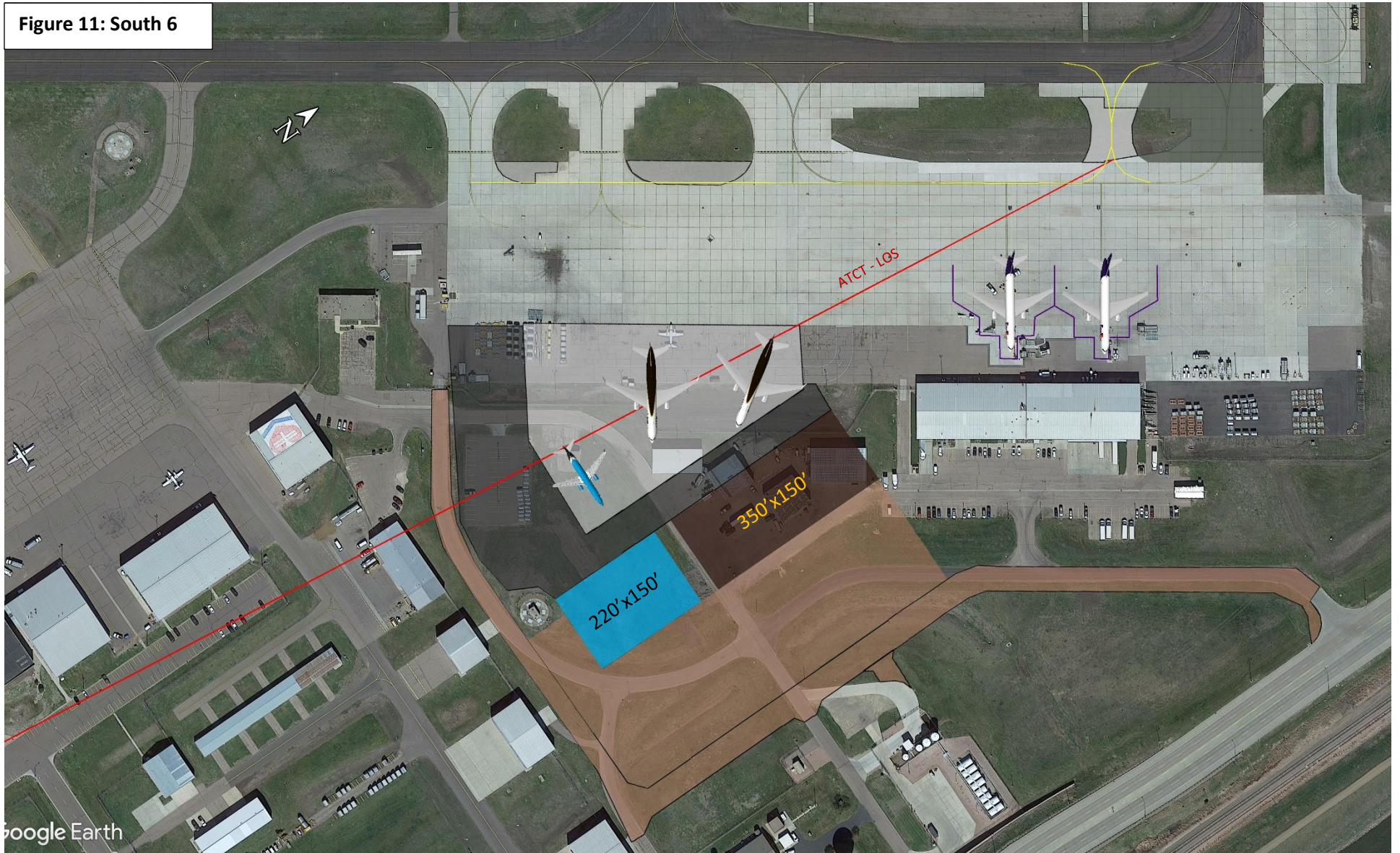
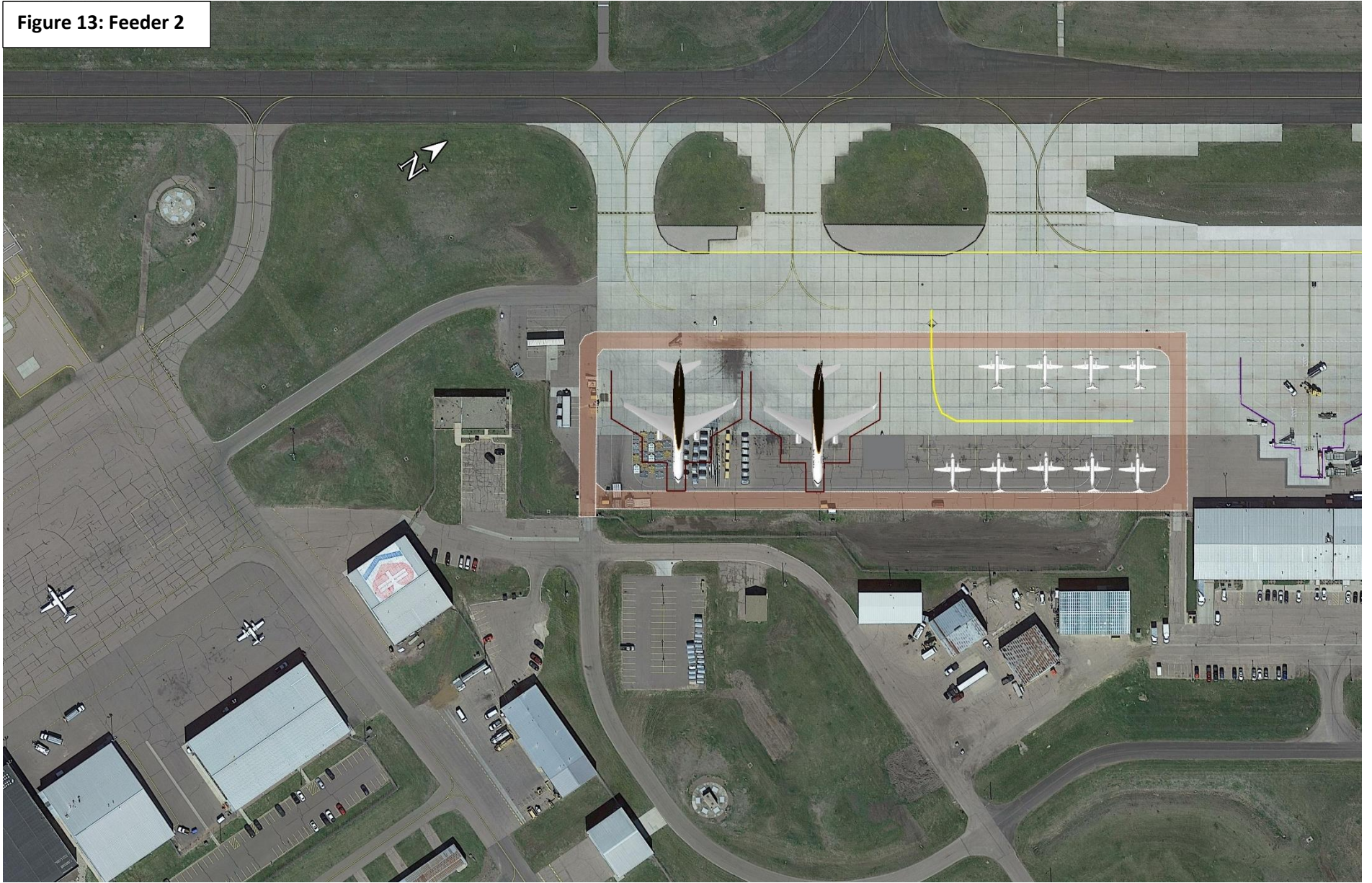


Figure 13: Feeder 2



Feeder 3

Feeder 3 (**Figure 14**) would involve construction of a new feeder aircraft apron in between the East GA Apron the East Cargo Apron similar to Feeder 1 (recommended concept from the previous Master Plan); however, the focus shifted from maximizing feeder parking positions to providing an efficient layout that minimized pavement needs. Alpine and Encore input indicates eight East Cargo parking positions are sufficient for existing operations. Feeder 3 allows for additional growth over the planning period by providing 11 parking positions.

Two phases for Feeder 3 are provided, with the second phase showing a potential feeder facility (250-foot-by-150-foot placeholder) with apron frontage added (pink building and pink apron outline).

Feeder 3 does not incorporate direct aircraft access from the proposed feeder apron and existing East Cargo Apron. Ground vehicles and tugs could directly travel between both areas.

This alternative could provide direct aircraft access between the two areas along the western edge, but this may have the unintended consequence of GA aircraft in the non-Secure Identification Display Area (SIDA) accidentally taxiing into SIDA areas and increasing accident potential with larger mainline cargo aircraft operations.

The South 3 alternative from the East Cargo Apron section was included on Figure 14 to provide context on how Feeder 3 could interact with mainline aircraft parking.

Feeder 4

Feeder 4 (**Figure 15**) would involve construction of a new feeder aircraft apron in between the East GA Apron the East Cargo Apron with parking parallel to the runway. Like Feeder 3, the focus for this alternative shifted from maximizing feeder parking positions to providing an efficient layout that minimized pavement needs. Alpine and Encore input indicates eight East Cargo parking positions are sufficient for existing operations. Feeder 4 allows for additional growth over the planning period by providing 10 parking positions.

Two phases for Feeder 4 are provided, with the second phase showing a potential feeder facility (250-foot-by-150-foot placeholder) with apron frontage added (pink building and pink apron outline). The building and associated apron frontage for Feeder 4 are located further east than Feeder 3.

Feeder 4 allows direct aircraft access from the proposed feeder apron to the existing East Cargo Apron on the western edge of pavement. Ground vehicles and tugs could directly travel between both areas. This alternative intentionally avoided direct access between Taxiway F and the East Cargo Apron to minimize the unintended consequence of GA aircraft in non-SIDA areas accidentally taxiing into SIDA areas and increasing accident potential with larger mainline cargo aircraft operations.

The South 3 alternative from the East Cargo Apron section was included on Figure 15 to provide context on how Feeder 4 could interact with mainline aircraft parking.

Figure 14: Feeder 3

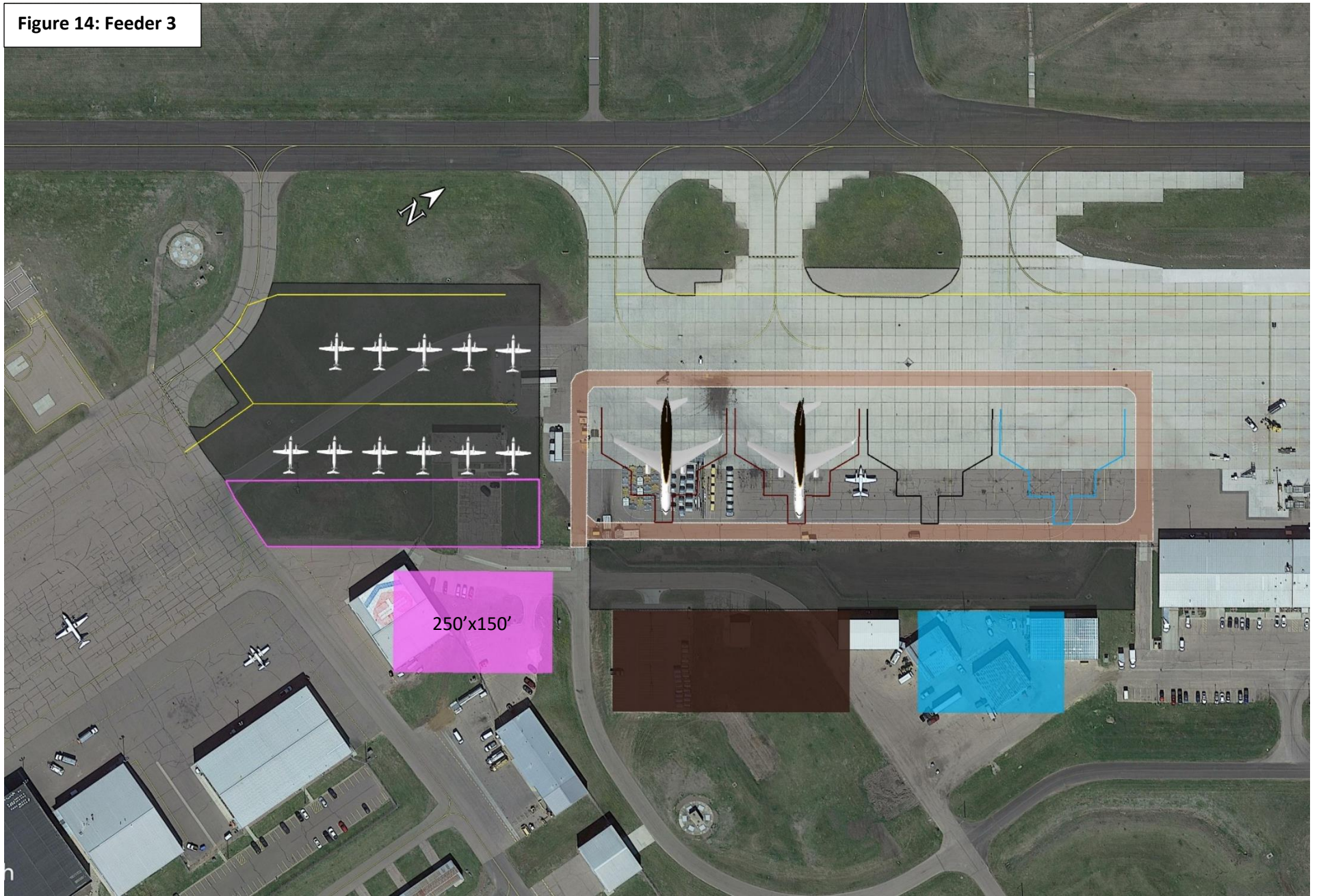
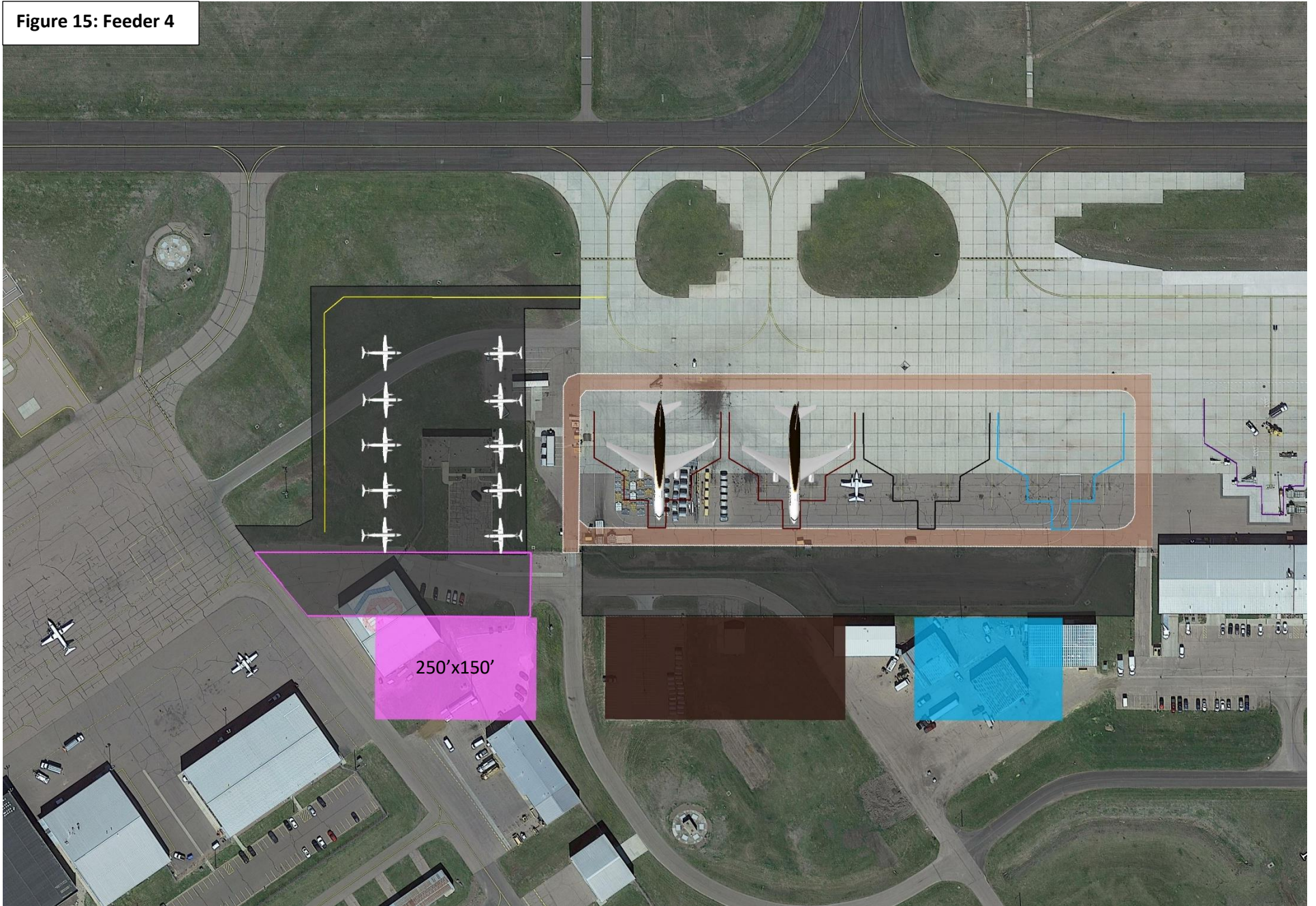


Figure 15: Feeder 4

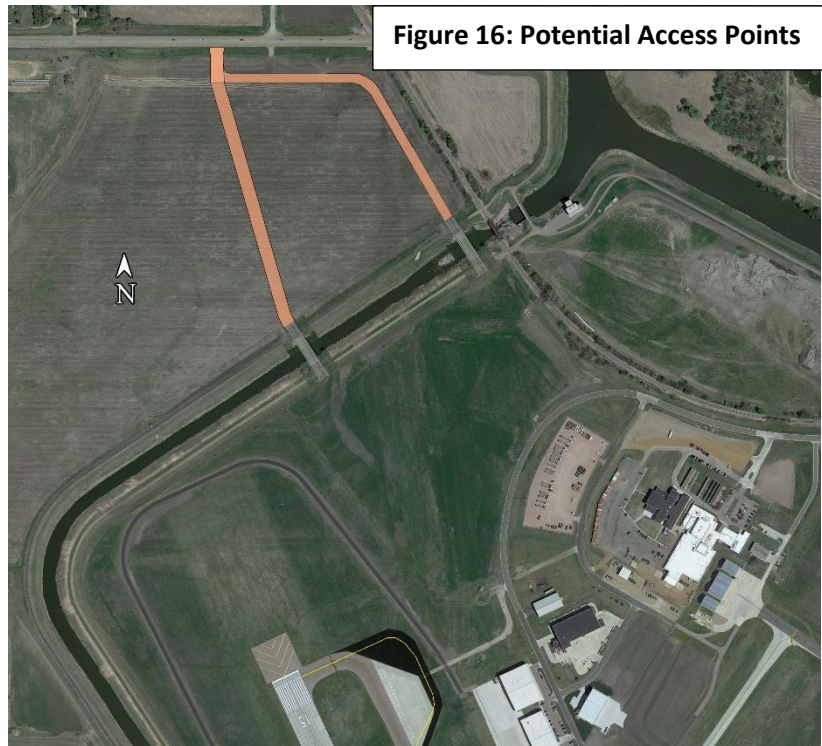


Northwest Development Cargo Alternatives

The Master Plan also developed cargo alternatives for developable space located to the northwest of the West GA Area. A major consideration for these alternatives was how to provide access to this area for Group III/IV cargo aircraft. Group IV taxiway standards were applied for the taxiway connector leading to the development area, but this could be adjusted if it is determined Group III aircraft would be the largest aircraft using the development.

The two development alternatives created for this area focus on providing access for cargo and FBO/Corporate development. All hangar/building blocks shown are 150 feet deep with areas more suited for mainline cargo operations providing more landside access/parking availability. Boeing 767, Boeing 757, and Boeing 737 aircraft are shown on the alternatives. Larger (B767) operations may be limited to certain apron areas.

Two access points from 60th Street North are provided for preliminary planning purposes (**Figure 16**), but further evaluation would be necessary to determine acceptable access points and a recommended bridge crossing point.



Northwest 1

Northwest 1 (**Figure 17**) provides one large cargo area along the northern edge of the development. The northeastern area of the development may be more suitable to feeder/corporate operations. Corporate/FBO expansion to the north of the Maverick/Sanford hangars is also portrayed on this alternative.

Northwest 2

Northwest 2 (**Figure 18**) also provides an apron in the northern area of the development capable of supporting cargo operations. This alternative provides for development along two sides of the apron with the northeast specifically planned for cargo operations. As in Northwest 1, corporate/FBO expansion to the north of the Maverick/Sanford hangars is also portrayed on this alternative.

Figure 17: Northwest 1

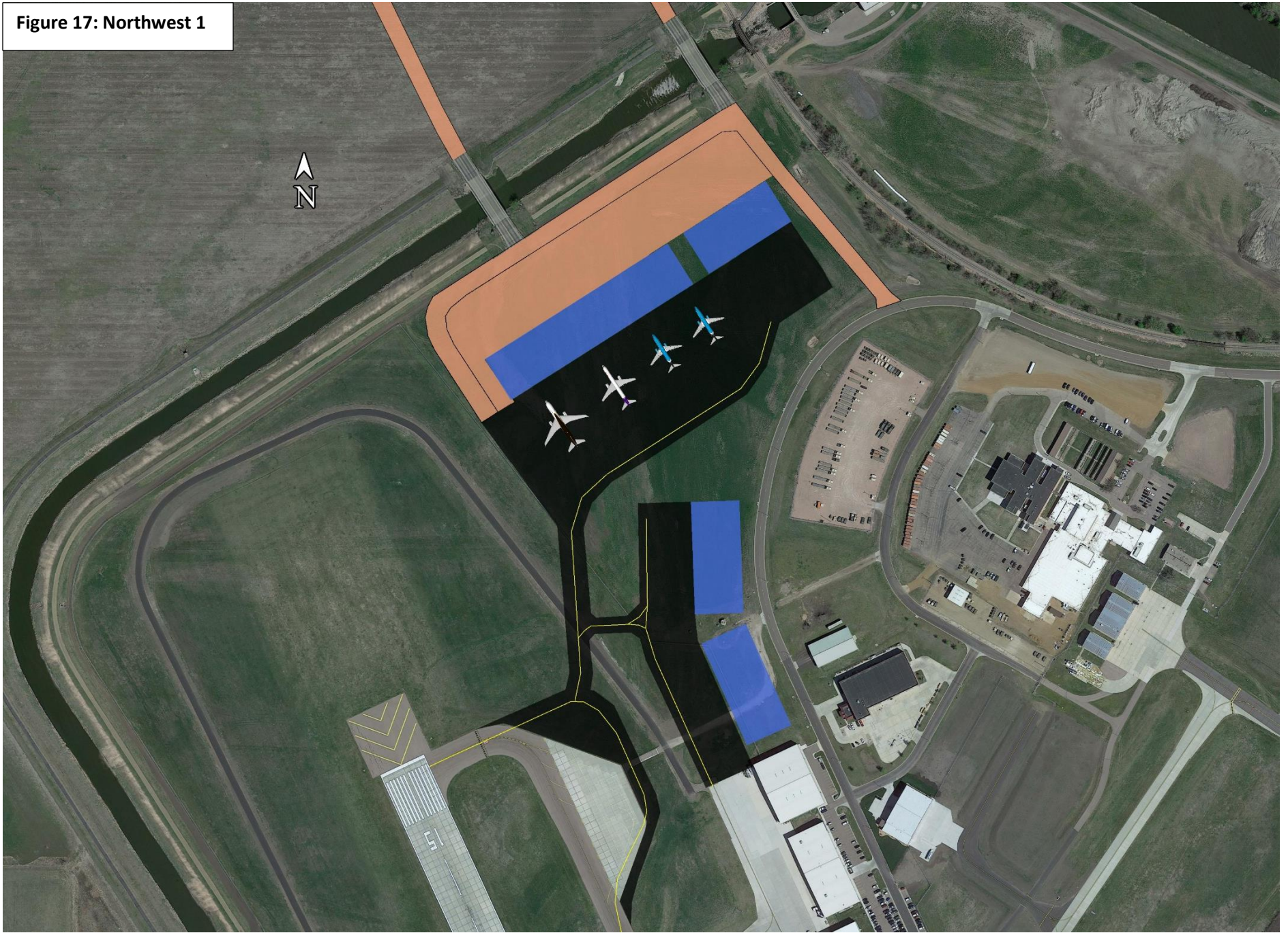
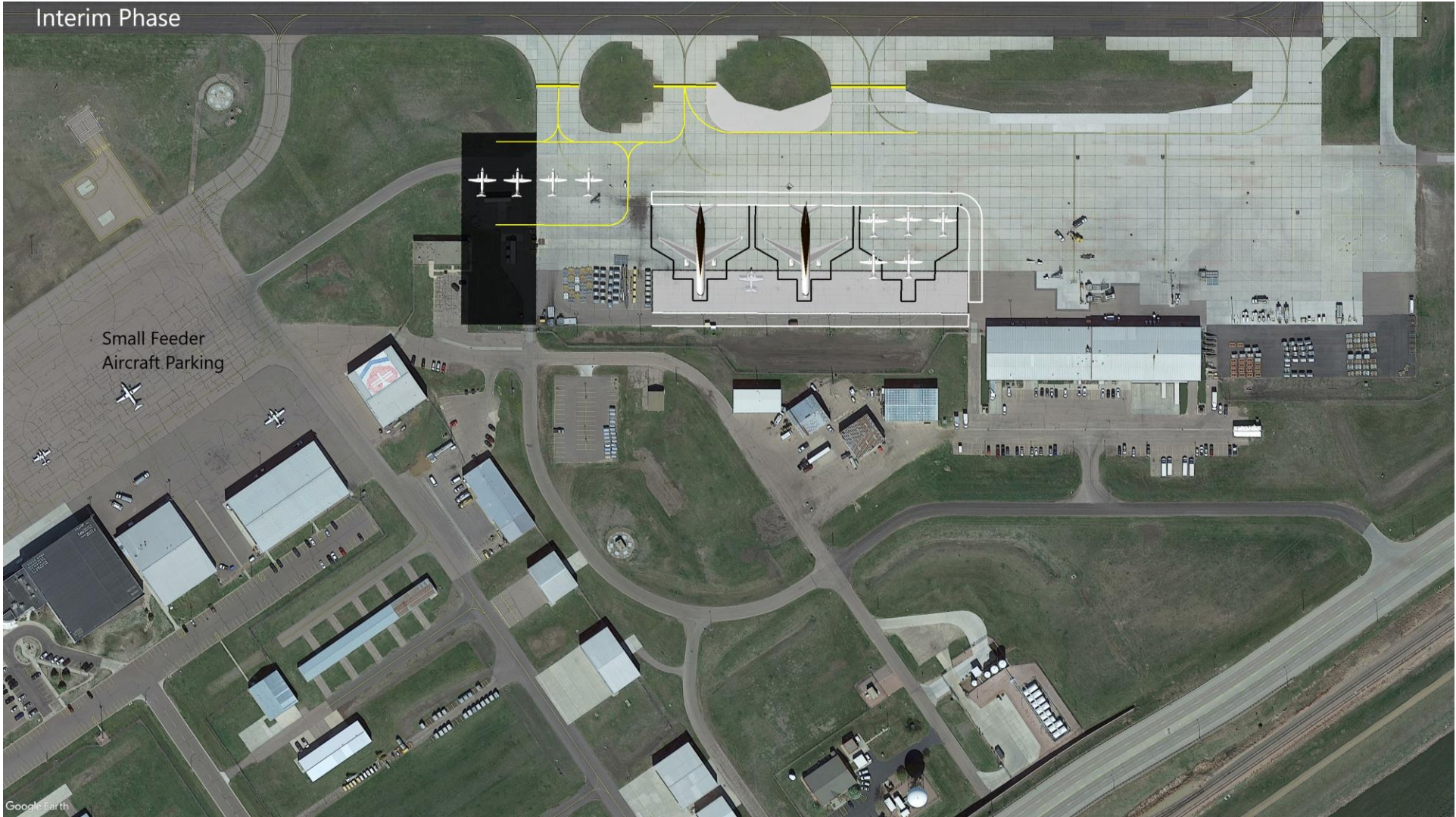


Figure 18: Northwest 2





Interim Phase