
MEMORANDUM

TO: Rick Barrett, MIG Inc.

FROM: Stephen Cook, PE; Chen Ryan Associates
Jonathan Sanchez; Chen Ryan Associates

DATE: September 21, 2016

RE: Poway Road Corridor Study – Preliminary Analysis Results

The purpose of this memorandum is to document the Preferred Plan conditions and Couplet Plan preliminary analysis results for the following four (4) different transportation modes: Pedestrian, Bicycle, Transit, and Vehicular. This memorandum also presents the previously documented Existing Conditions results included in Chapter 3 of the Poway Road Corridor Study. It is important to note that under Preferred Plan conditions, Poway Road was analyzed in its entirety with cross-section B: Class IV Cycle Track, while for the Couplet Plan, Poway Road was analyzed with cross-section B: Class IV Cycle Track between Oak Knoll Road and Poway Fun Bowl, cross-section E: Couplet for the couplet section, and back to cross-section B: Class IV Cycle Track east of the couplet. See **Attachment A** for cross-sections.

It is assumed that both the Preferred Plan and the Couplet Plan would have consistent land uses under build out conditions. The Assumed buildout land uses are provided as **Attachment B**.

Multi-Modal Analysis

In general, street and freeway system Level of Service (LOS) is based on facility operations, while multi-modal LOS (MMLOS) for pedestrian, transit, and bicycle facilities are evaluated based on the user's perception of the quality of the environment or systems while using these modes. The multi-modal operations analysis was performed utilizing the HCS 2010 (2010 HCM methodology) software.

The HCS 2010 software output assigns numerical ratings to the various modes of travel. These ratings are then converted into A - F letter grades to represent the travelers' perception of the subject facilities quality. LOS A represents the best conditions from the traveler's perspective, while LOS F represents the worst. **Table 1** displays the LOS letter grade numerical equivalents for the non-vehicular facilities (pedestrian, transit, and bicycle).

Table 1 Multi-Modal LOS Letter Grade Numerical Equivalents	
LOS Letter Grade	Multi-Modal Score
A	≤ 2.00
B	$2.00 < \text{and } \leq 2.75$
C	$2.75 < \text{and } \leq 3.50$
D	$3.50 < \text{and } \leq 4.25$
E	$4.25 < \text{and } \leq 5.00$
F	> 5.00

Source: Transportation Research Board NCHRP Project 3-70, Highway Capacity Manual 2010.

Pedestrian LOS

Pedestrian LOS is a measure of the pedestrian’s experience at intersections and along street links between the intersections. Pedestrian LOS is a function of the following number of variables:

- Lateral separation between pedestrians and vehicular traffic
- Width of sidewalk
- Speed and makeup of the vehicular traffic
- Difficulty of arterial crossings
- Right-turn on red restrictions
- Permissive left-turn during “Walk” phase
- Delay experienced while waiting to cross at signal
- Intersection crossing distance
- Cross-street vehicular traffic volume and speed

Existing Conditions - Figure 1 and Figure 2 display Pedestrian LOS during the AM and PM peak hour, respectively, along Poway Road within the study area.

Preferred Plan Conditions - Figure 3 and Figure 4 display Pedestrian LOS during the AM and PM peak hour, respectively, along Poway Road within the study area. As it was mentioned earlier in this memorandum, cross-section B was analyzed under this scenario.

Couplet Plan Conditions – Figure 5 and Figure 6 display Pedestrian LOS during the AM and PM peak hour, respectively, along Poway Road within the study area. As it was mentioned earlier in this memorandum, cross-section B and E were analyzed under this scenario.

As shown in the Figures, there is minimal to no change in the pedestrian LOS within the corridor between existing and the Preferred Plan conditions (mostly operating at LOS D). However, the Pedestrian LOS does improve to LOS C or better within the couplet area, under the Couplet alternative. This improvement is predominantly due to the increased separation between pedestrian and vehicles (angled parking and side-path) as well as the reduction in vehicular traffic due to the separation of directions.

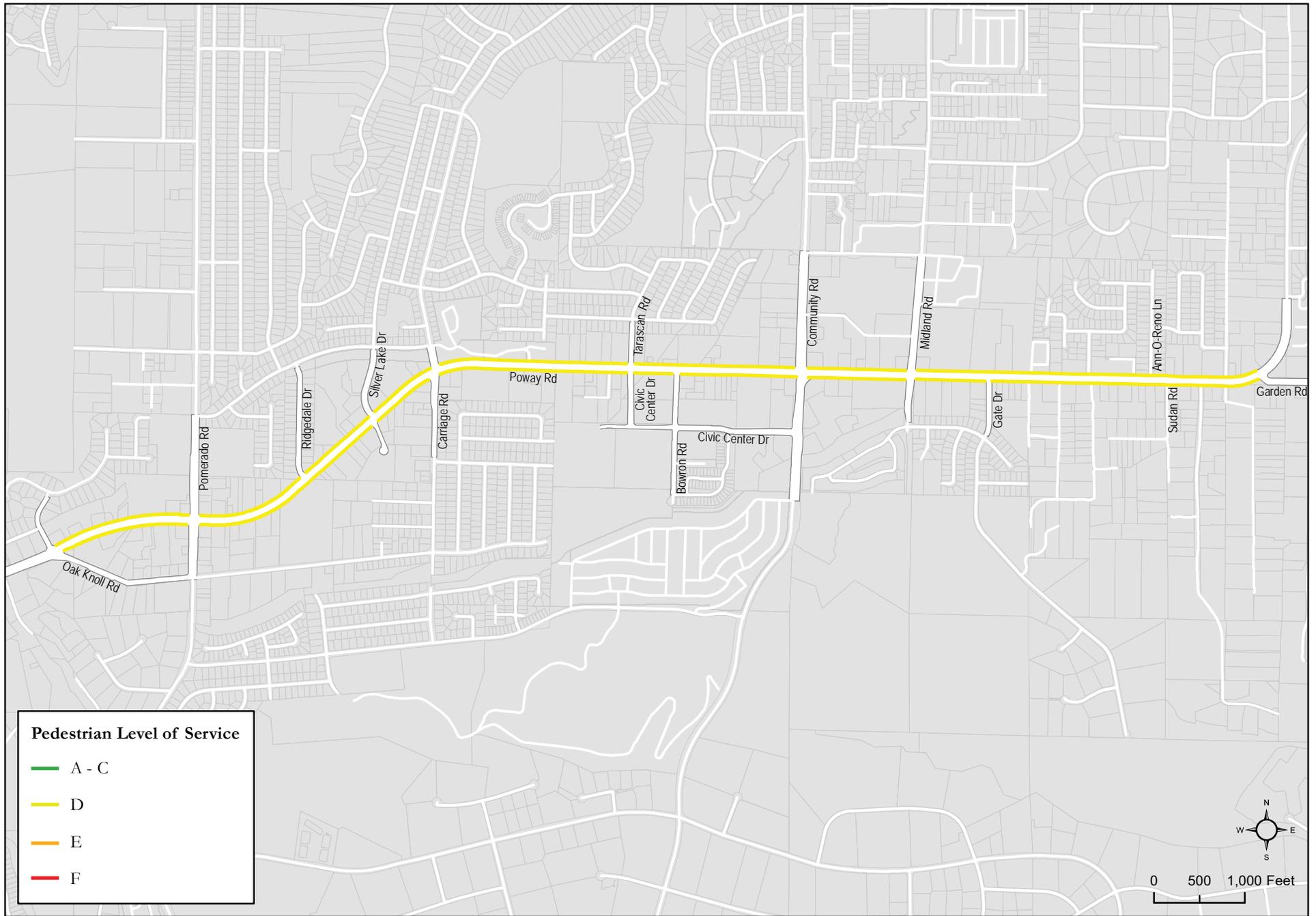


Figure 1
AM Peak Hour Pedestrian Level of Service - Existing Conditions

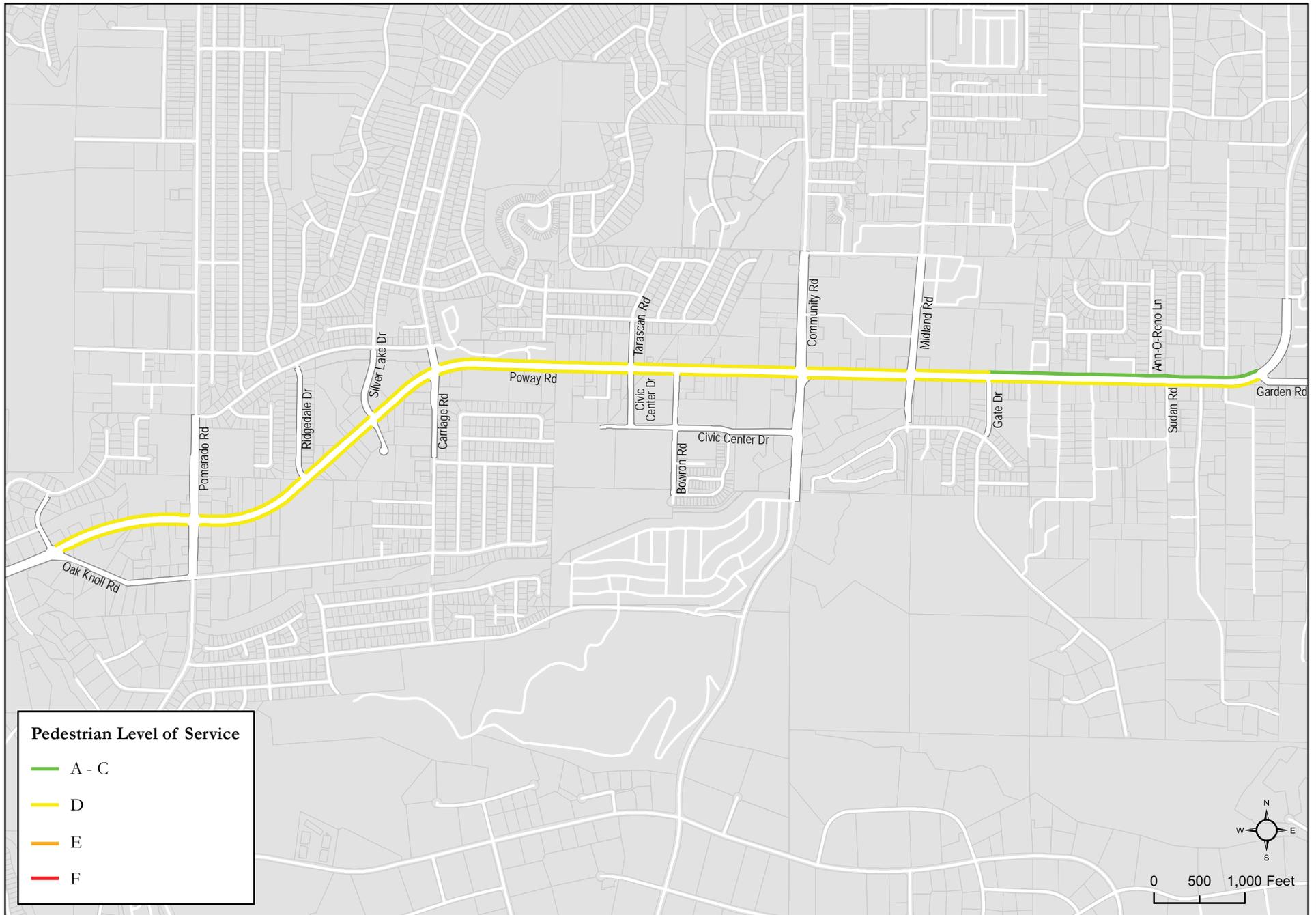


Figure 2
PM Peak Hour Pedestrian Level of Service - Existing Conditions

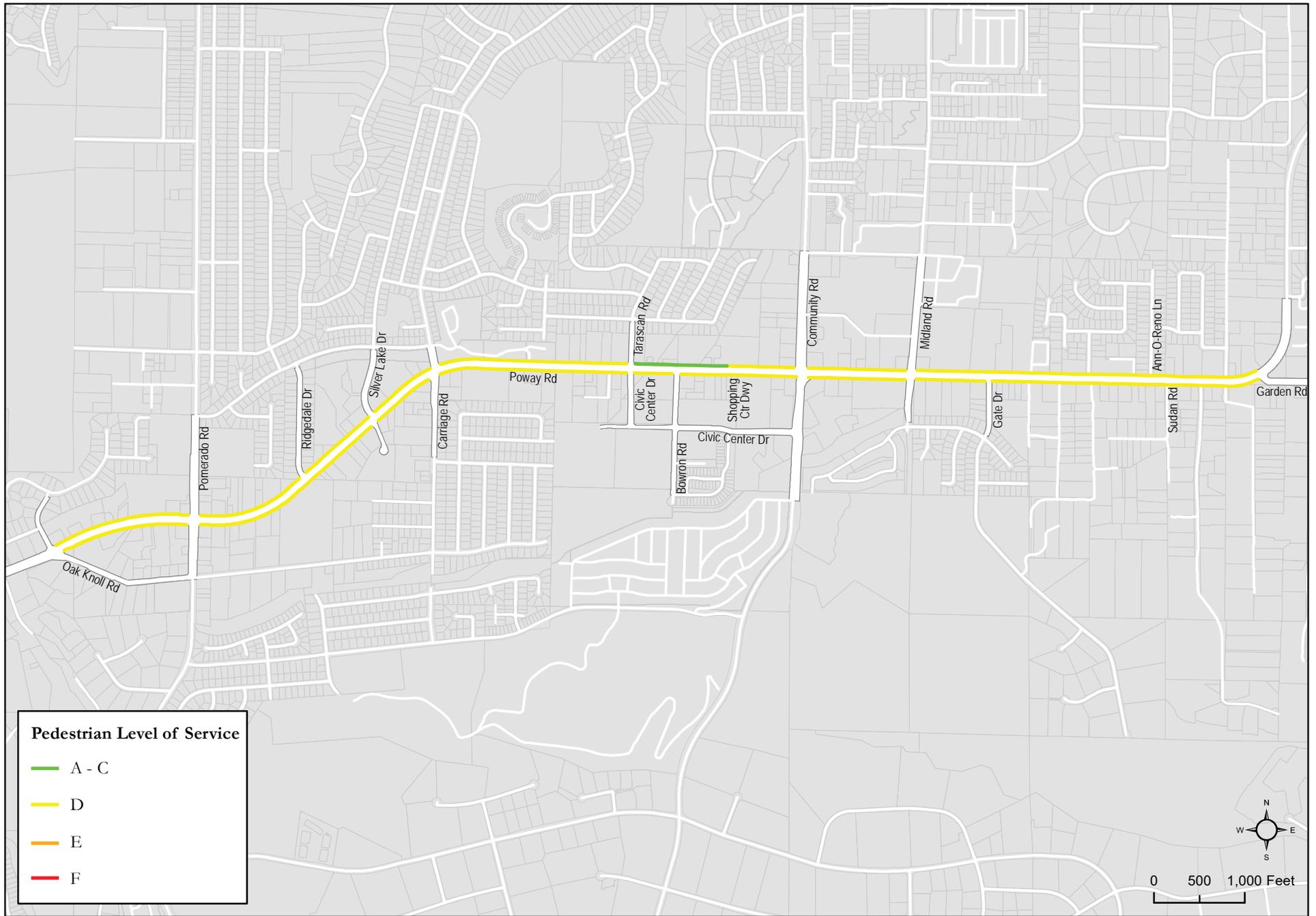


Figure 3
AM Peak Hour Pedestrian Level of Service - Preferred Plan Conditions



Figure 4
PM Peak Hour Pedestrian Level of Service - Preferred Plan Conditions

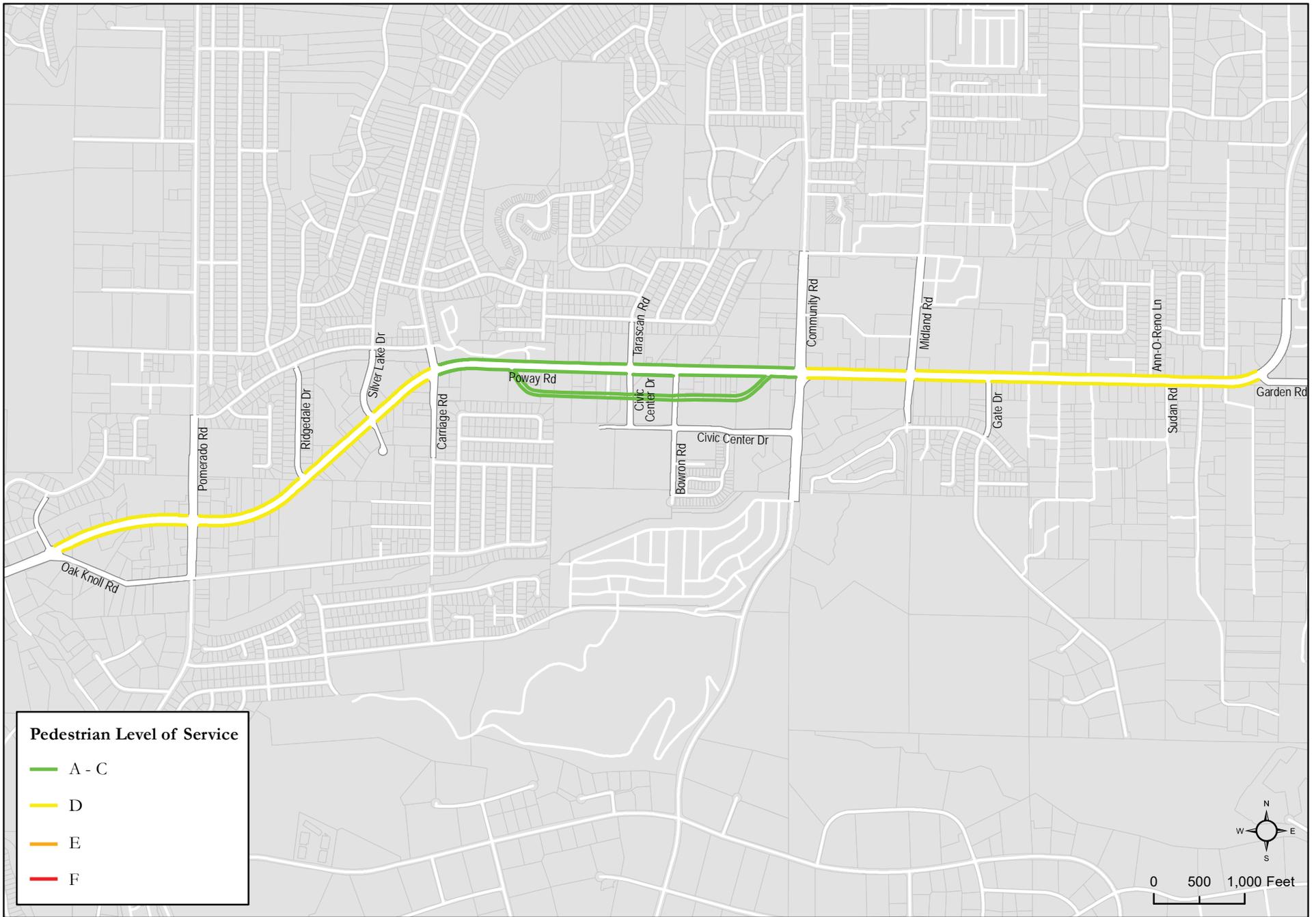


Figure 5
AM Peak Hour Pedestrian Level of Service - Couplet Plan Conditions

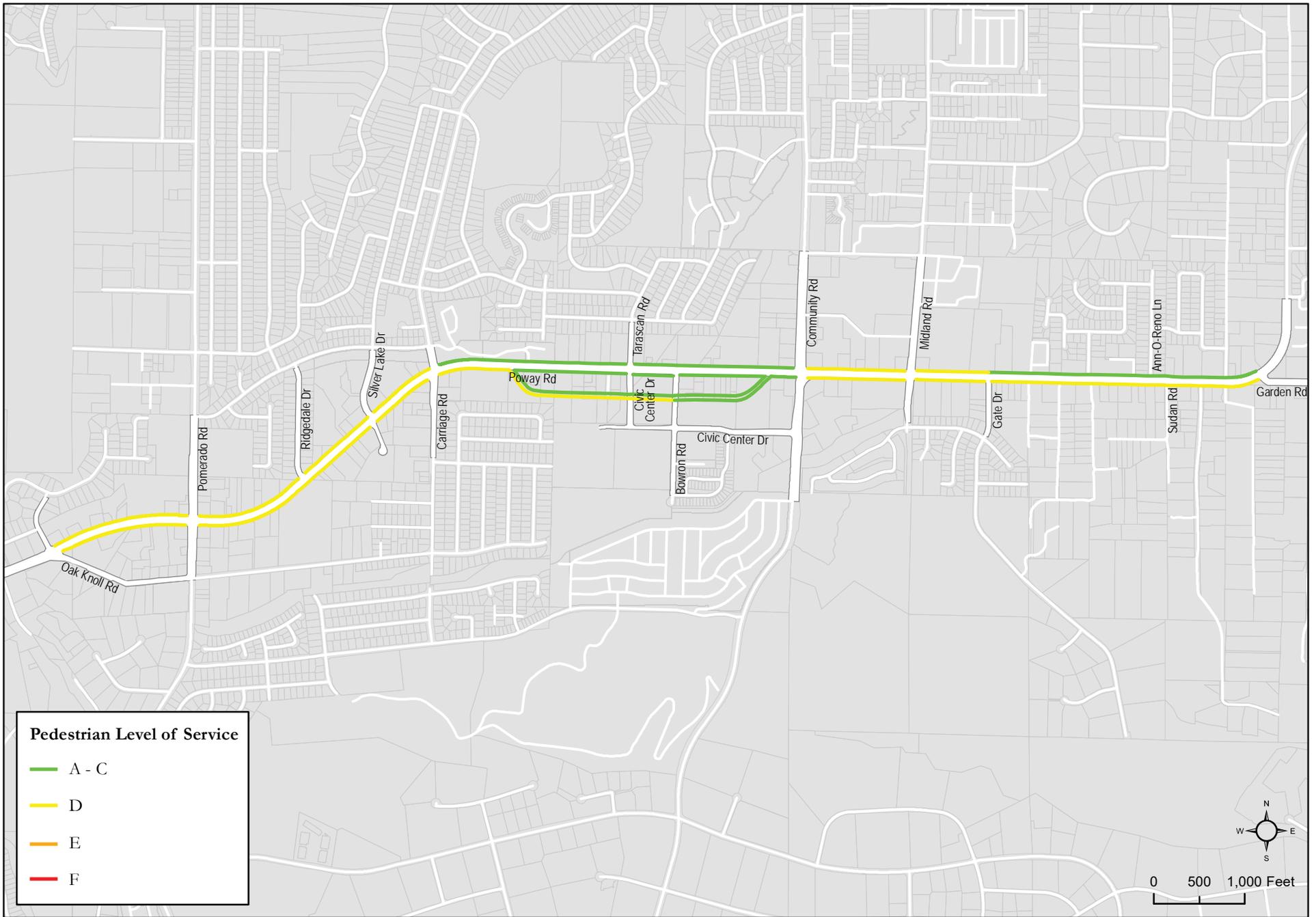


Figure 6
PM Peak Hour Pedestrian Level of Service - Couplet Plan Conditions

Bicycle LOS

Bicycle LOS is a weighted combination of the bicyclist's experience at intersections and along street links between the intersections. Bicycle LOS is a function of the following five variables:

- Lateral separation between bicycles and vehicular traffic
- Speed and makeup of the vehicular traffic
- Pavement conditions
- Directional vehicular traffic volumes
- Intersection crossing distance

Existing Conditions – **Figure 7** and **Figure 8** display Bicycle LOS during the AM and PM peak hour, respectively, along Poway Road within the study area.

Preferred Plan Conditions - **Figure 9** and **Figure 10** display Bicycle LOS during the AM and PM peak hour, respectively, along Poway Road within the study area. As it was mentioned earlier in this memorandum, cross-section B was analyzed under this scenario.

Couplet Plan Conditions – **Figure 11** and **Figure 12** display Bicycle LOS during the AM and PM peak hour, respectively, along Poway Road within the study area. As it was mentioned earlier in this memorandum, cross-section B and E were analyzed under this scenario.

As shown in the Figures, the existing Bicycle LOS is predominantly at LOS D throughout most of the Poway Road corridor, with some segments operating at LOS E or F. However, with the implementation of the proposed cycle track throughout the corridor under both the Preferred and Couplet Plan, the Bicycle LOS will improve to LOS A.

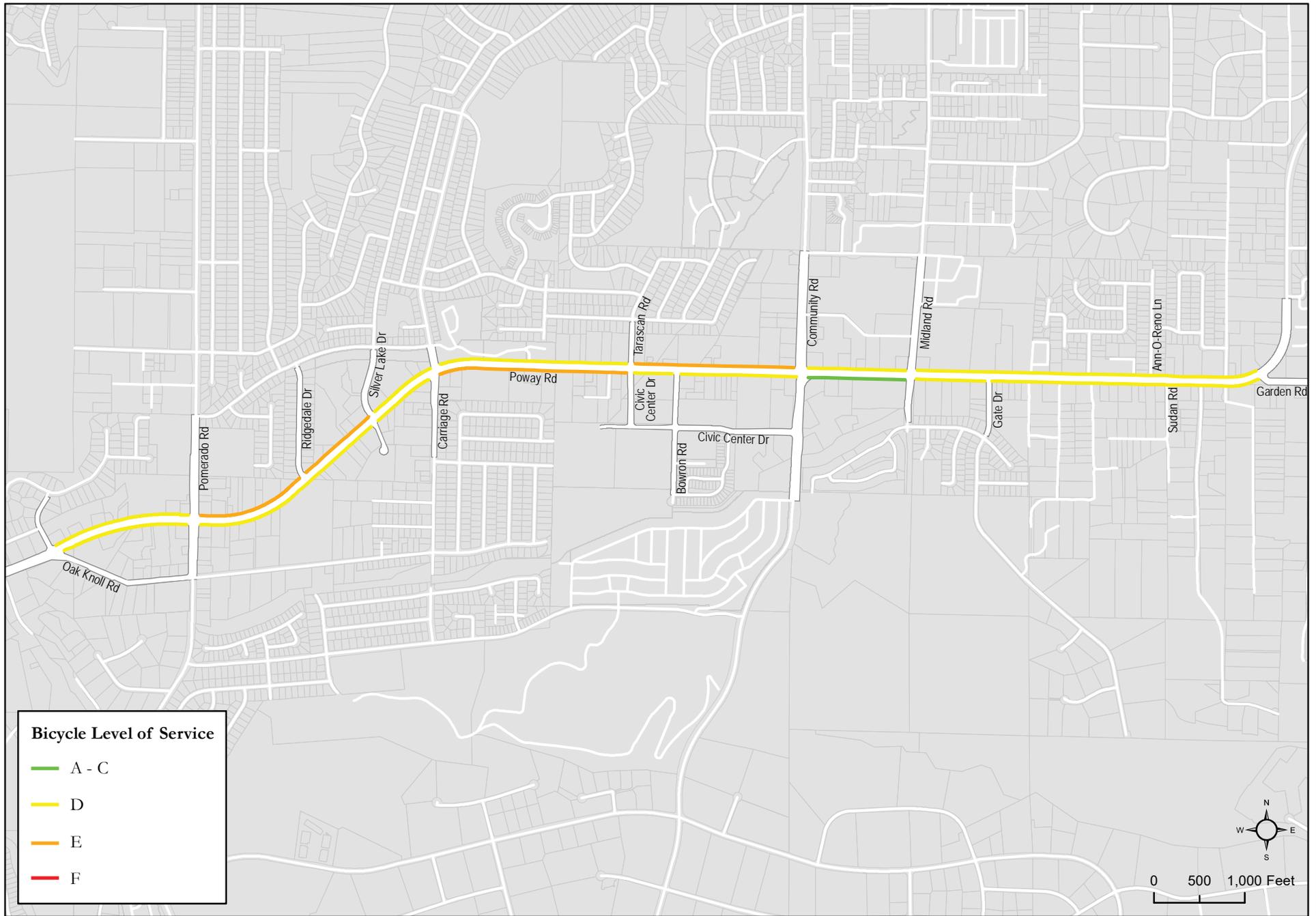


Figure 7
AM Peak Hour Bicycle Level of Service - Existing Conditions

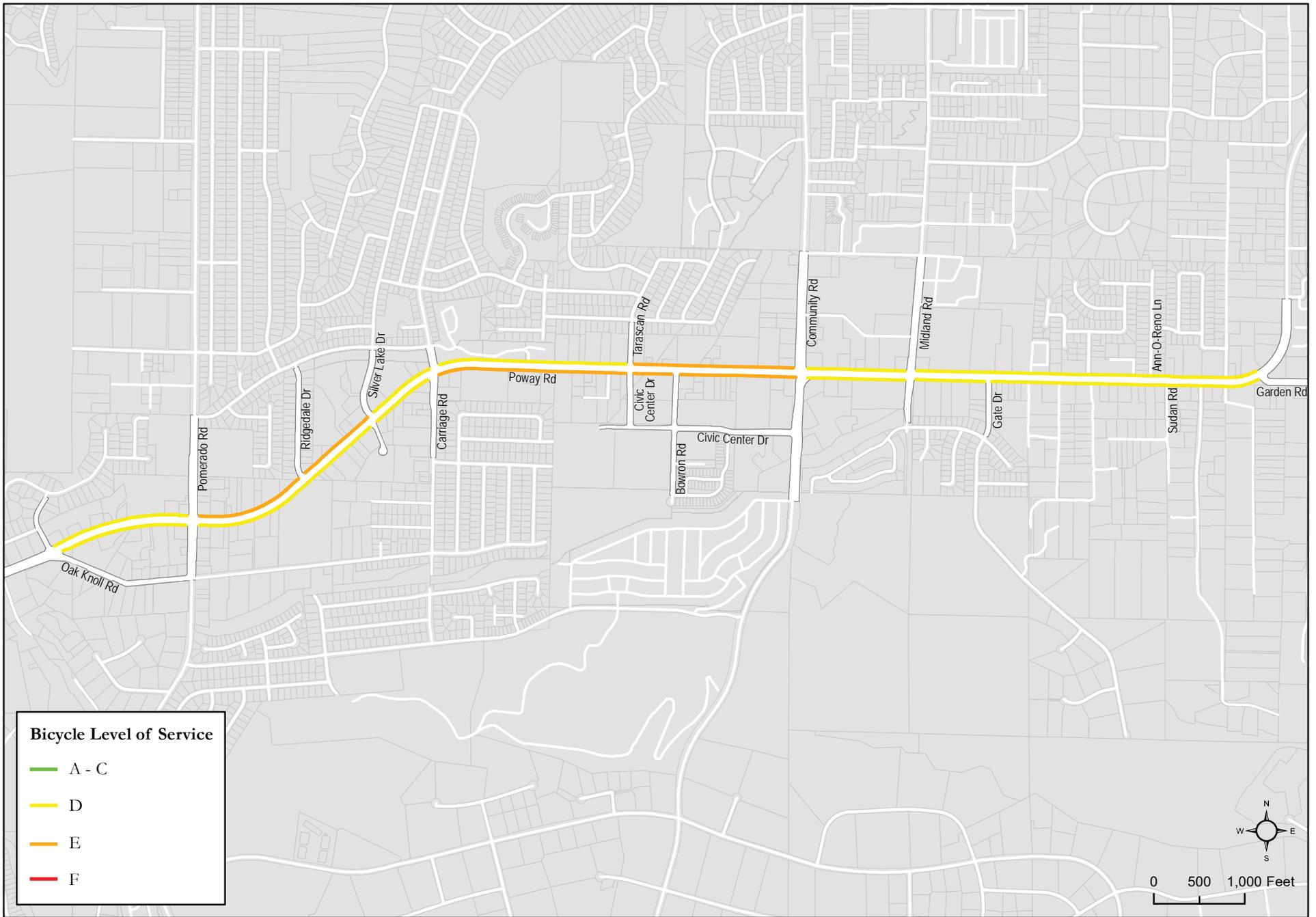


Figure 8
PM Peak Hour Bicycle Level of Service - Existing Conditions

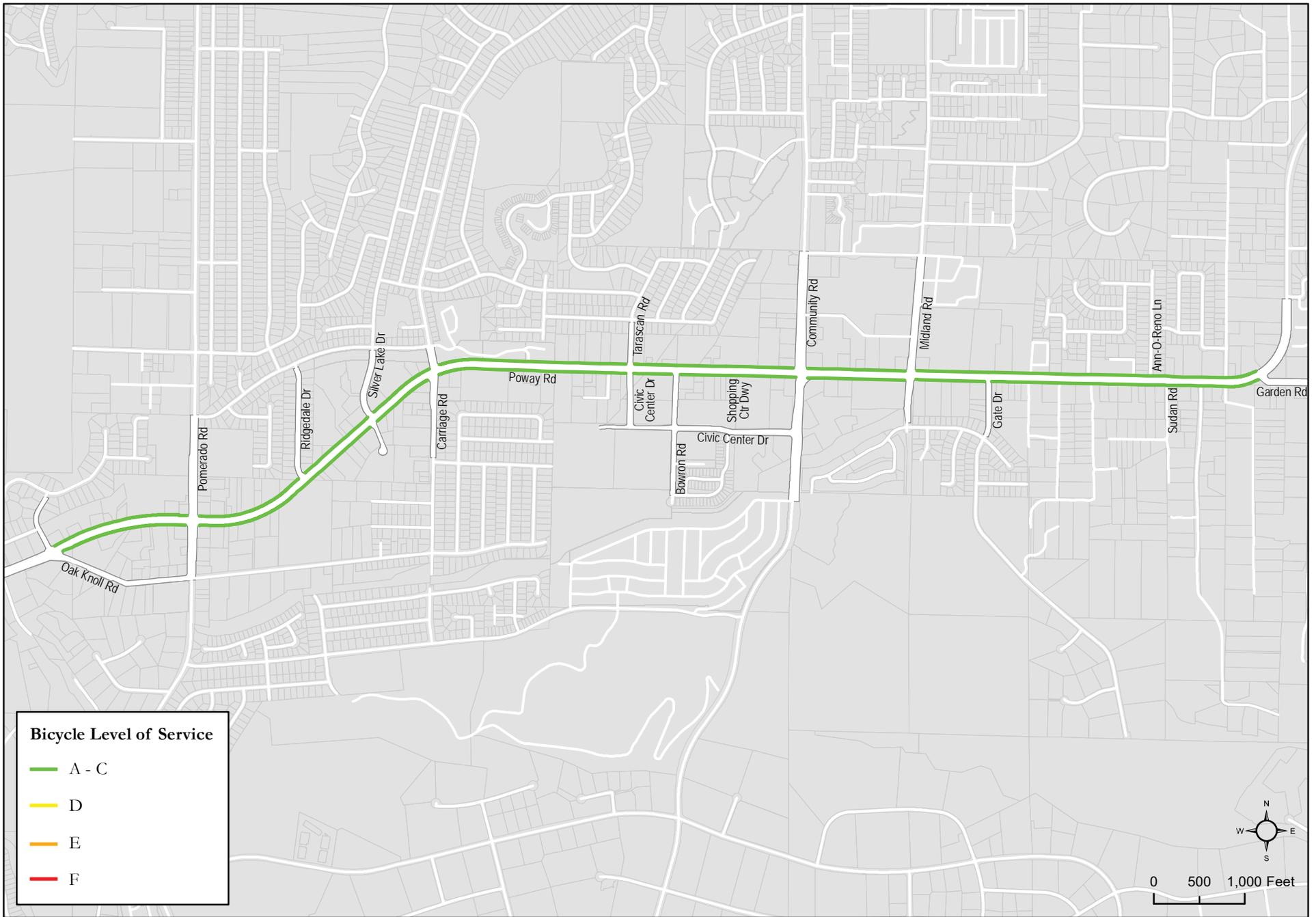


Figure 9
AM Peak Hour Bicycle Level of Service - Preferred Plan Conditions

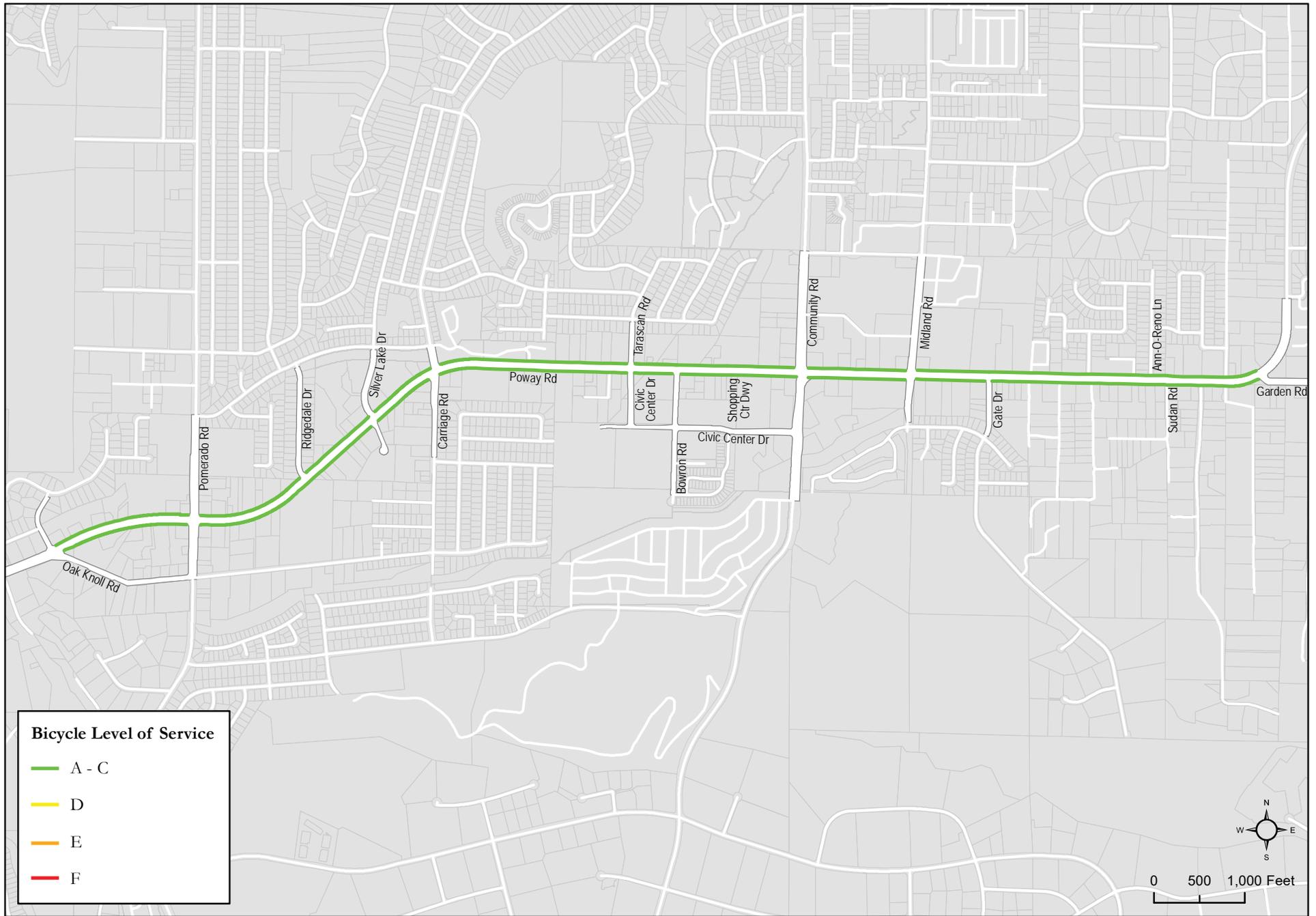


Figure 10
 PM Peak Hour Bicycle Level of Service - Preferred Plan Conditions

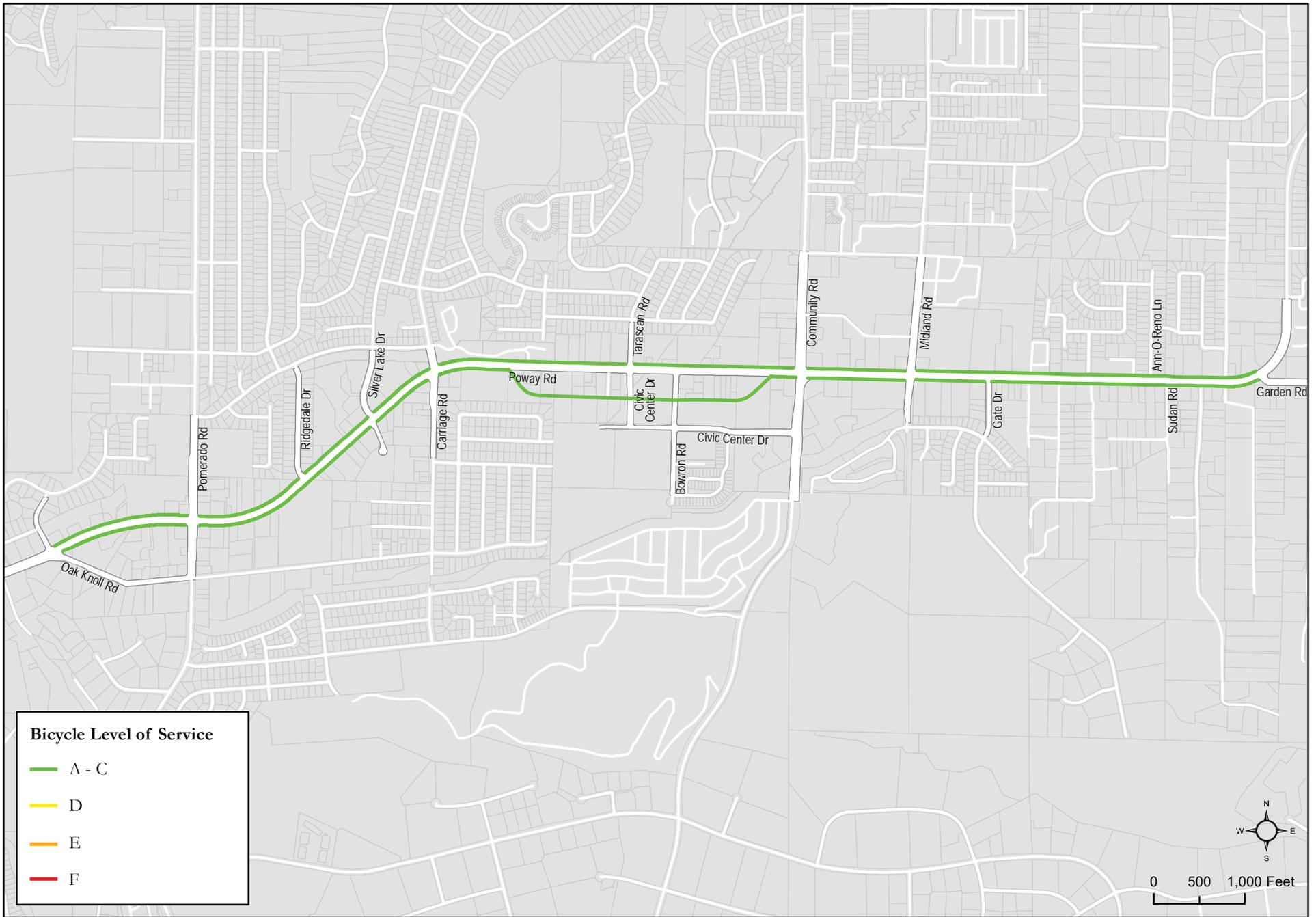


Figure 11
AM Peak Hour Bicycle Level of Service - Couplet Plan Conditions

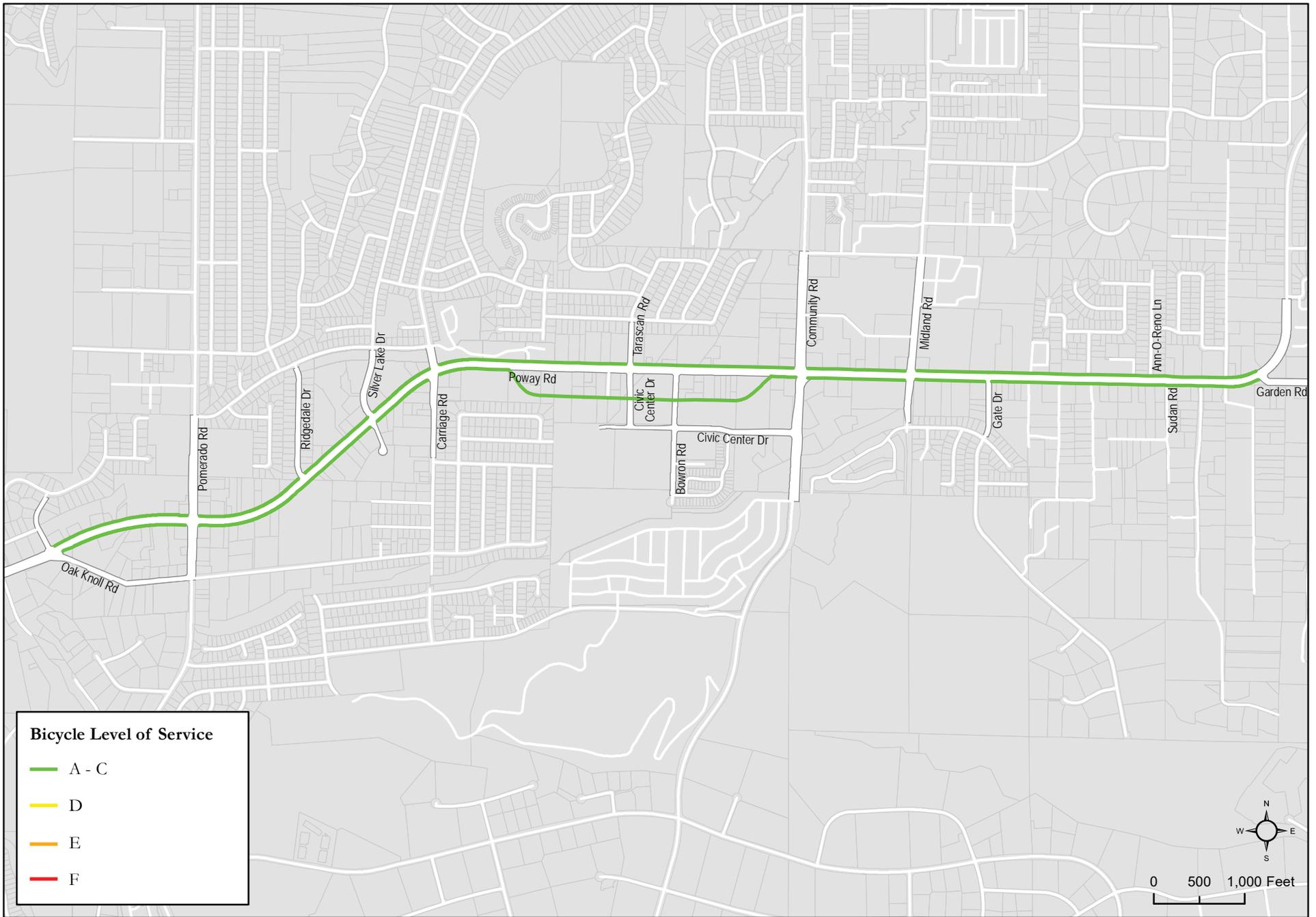


Figure 12
 PM Peak Hour Bicycle Level of Service - Couplet Plan Conditions

Transit LOS

Transit LOS is based on a combination of the user's experience while accessing the transit system, while waiting for transit service, and while riding on transit. The access experience is represented by the pedestrian LOS score (discussed above) while the pedestrian is accessing a bus stop. This score is specific to the direction of travel along a street. The waiting and riding experiences are combined into a transit wait/ride score. The transit wait/ride score is a function of the average headway between transit vehicles and the perceived travel time.

The following variables are used to determine the transit LOS:

- Frequency of service
- Mean speed
- Load factors
- Quality of pedestrian access to transit stops
- Transit stop amenities

Existing Conditions – Figure 13 and Figure 14 display Transit LOS during the AM and PM peak hour, respectively, along Poway Road within the study area.

Preferred Plan conditions – Figure 15 and Figure 16 display Transit LOS during the AM and PM peak hour, respectively, along Poway Road within the study area. As it was mentioned earlier in this memorandum, cross-section B was analyzed under this scenario.

Couplet Plan Conditions – Figure 17 and Figure 18 display Transit LOS during the AM and PM peak hour, respectively, along Poway Road within the study area. As it was mentioned earlier in this memorandum, cross-section B and E were analyzed under this scenario.

As shown in the Figures, the current Transit LOS within the Poway Road Corridor is LOS C or better, with the exception of the segment between Oak Knoll Road and Pomerado Road which operates at LOS D in both directions. Since neither the Preferred Plan nor the Couplet Plan include transit improvements within the corridor, the Transit LOS is projected to stay generally consistent with existing conditions, under both alternatives.

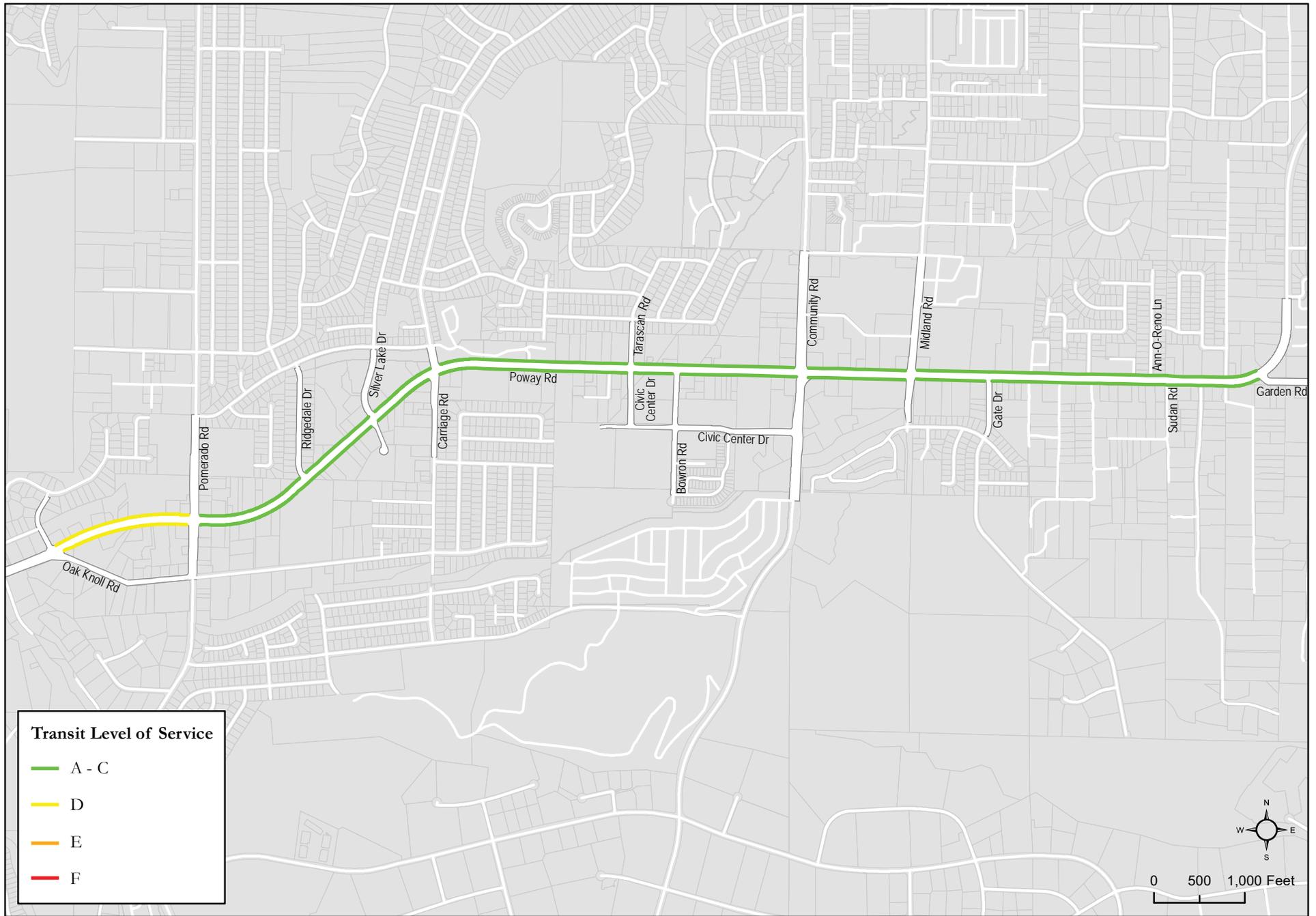


Figure 13
AM Peak Hour Transit Level of Service - Existing Conditions

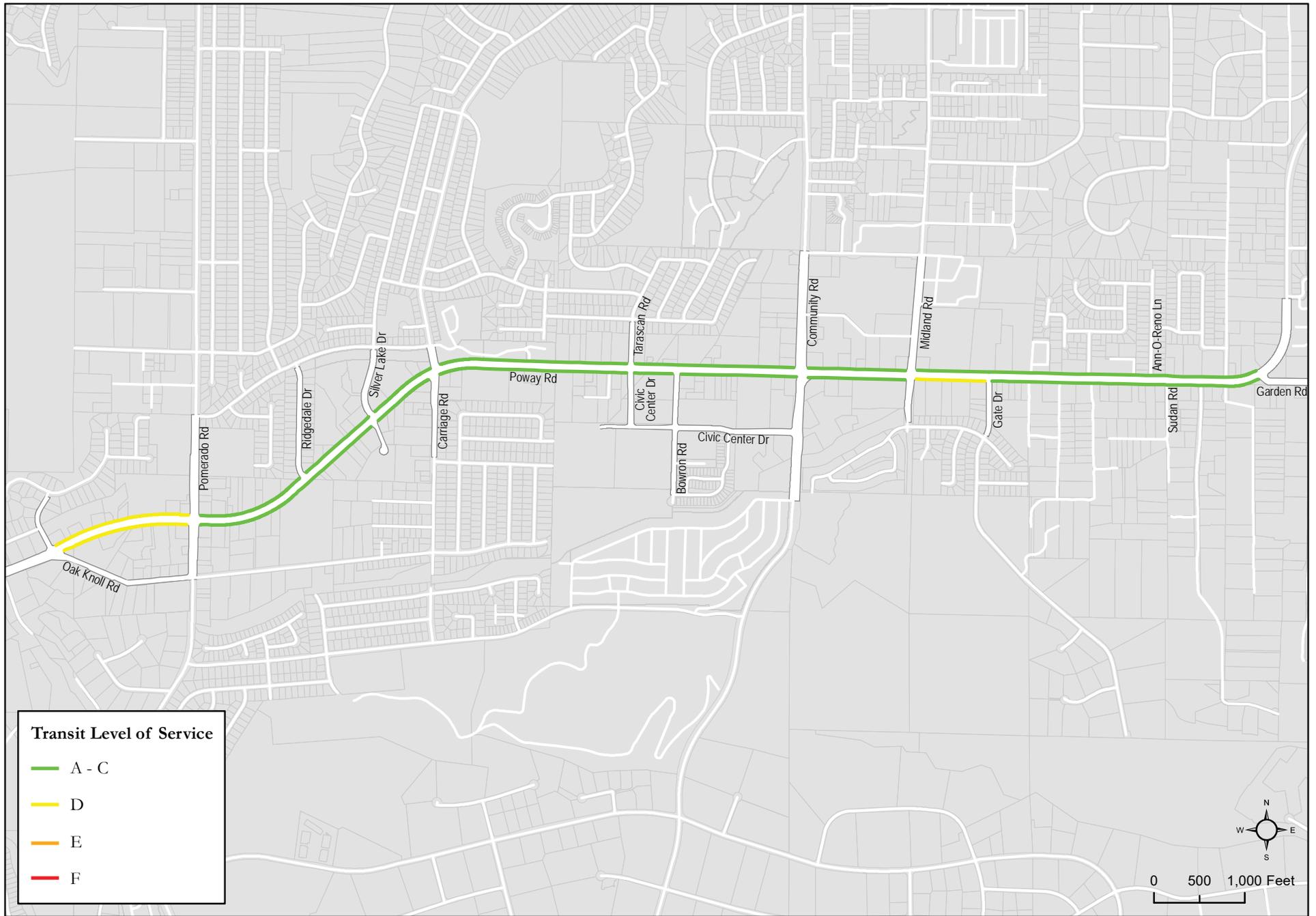


Figure 14
PM Peak Hour Transit Level of Service - Existing Conditions

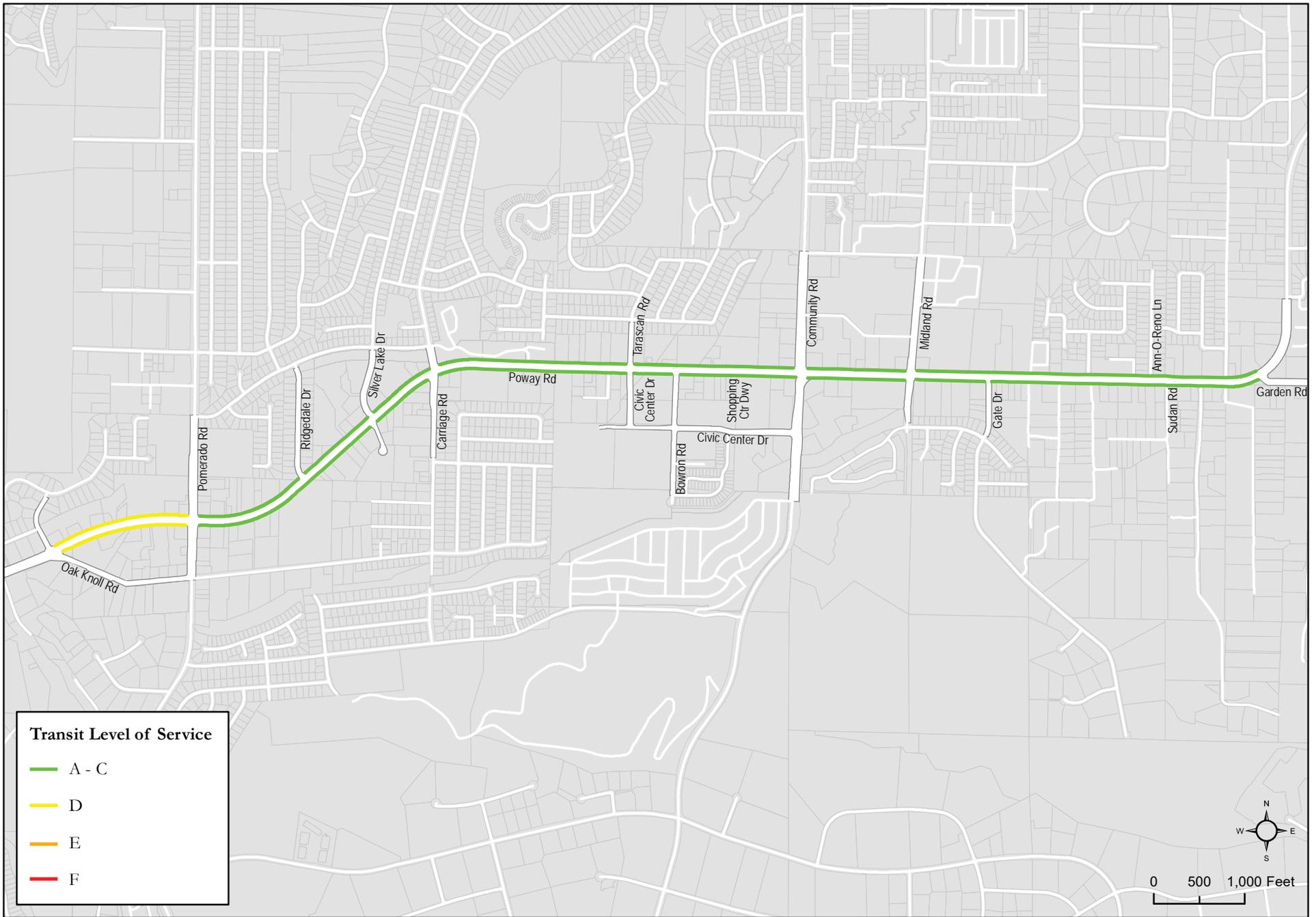


Figure 15
AM Peak Hour Transit Level of Service - Preferred Plan Conditions

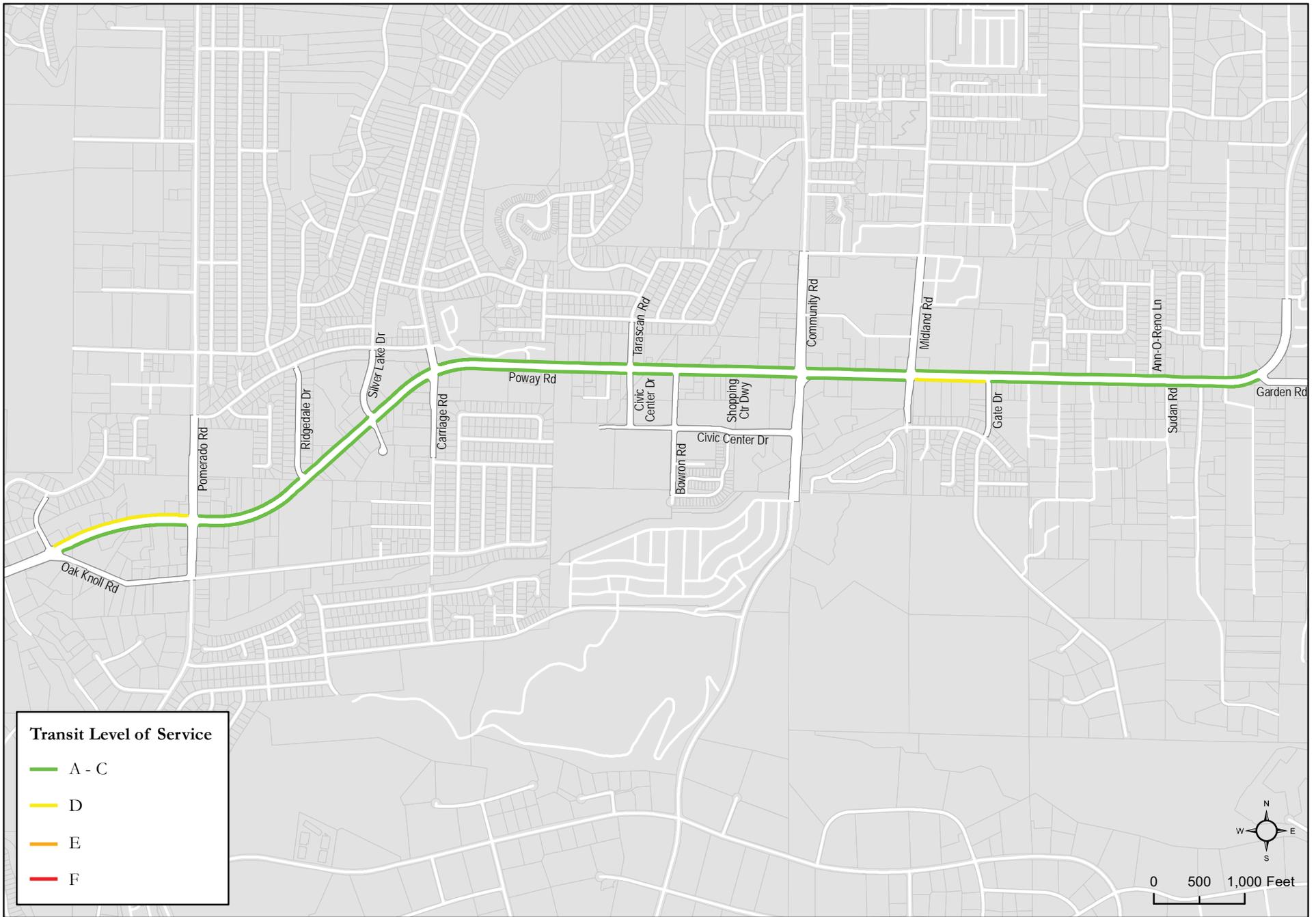


Figure 16
PM Peak Hour Transit Level of Service - Preferred Plan Conditions

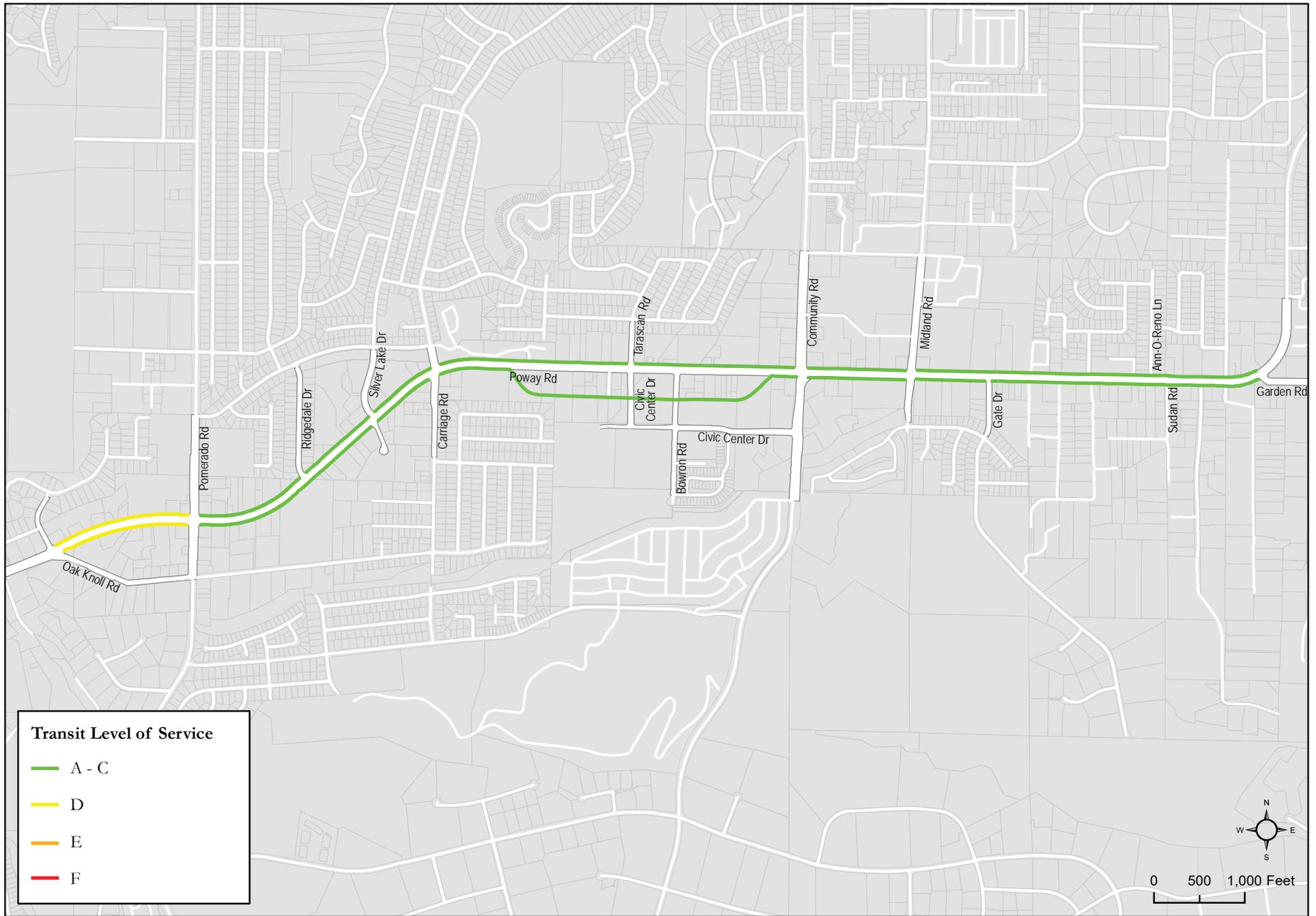


Figure 17
AM Peak Hour Transit Level of Service - Couplet Plan Conditions

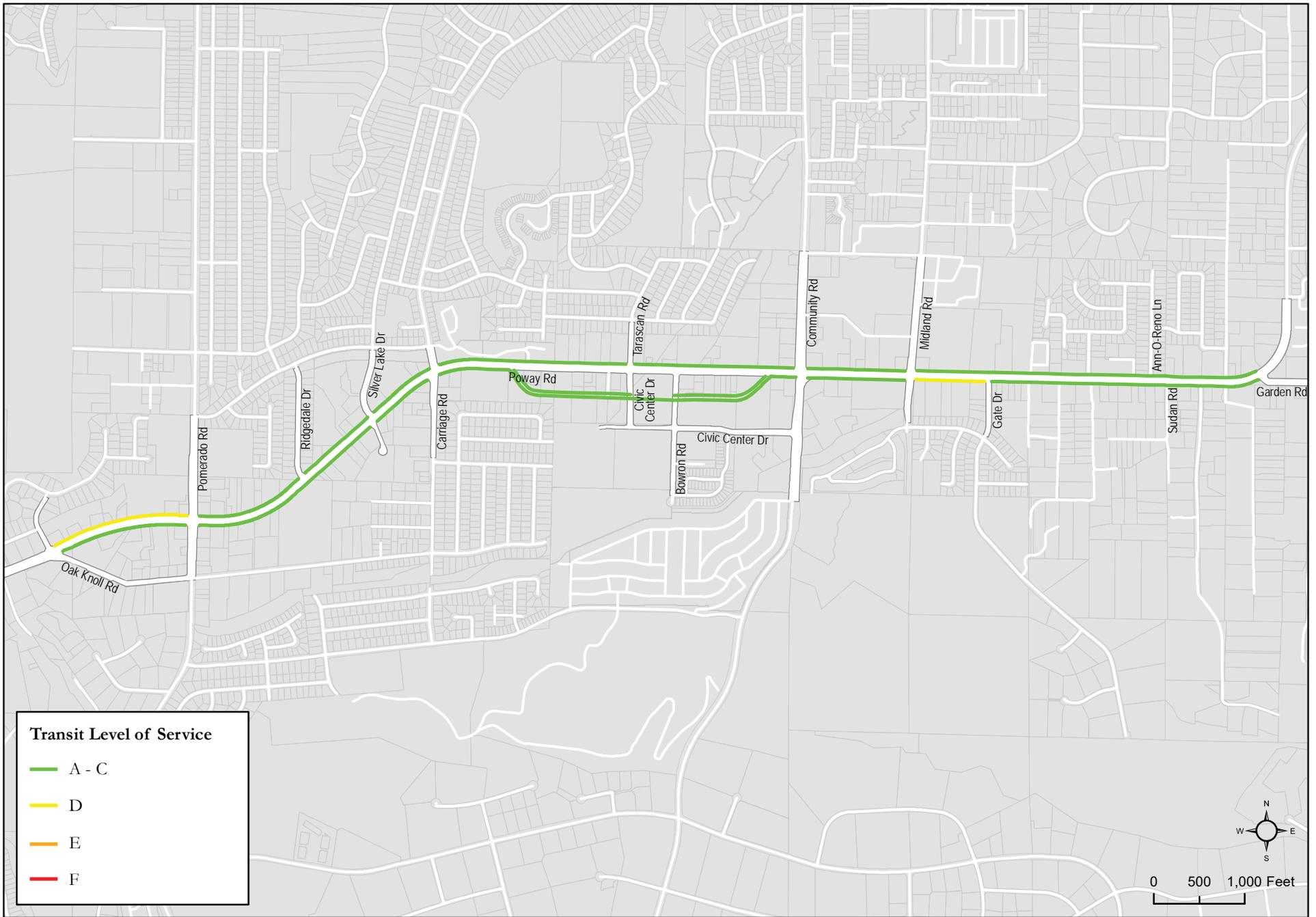


Figure 18
PM Peak Hour Transit Level of Service - Couplet Plan Conditions

Intersection LOS

Intersection LOS was evaluated based on the methodologies outlined in the 2010 Highway Capacity Manual. Intersection LOS is based on the average delay in which a motorist will experience at the intersection. Average intersection delay is calculated based on the following factors:

- Traffic volumes
- Intersection Signal Timing
- Intersection Geometry

Existing Conditions – Figure 19 displays Intersection LOS during the AM and PM peak hour along Poway Road within the study area.

Preferred Plan conditions – Figure 20 displays Intersection LOS during the AM and PM peak hour along Poway Road within the study area. As it was mentioned earlier in this memorandum, cross-section B was analyzed under this scenario.

Couplet Plan Conditions – Figure 21 displays Intersection LOS during the AM and PM peak hour along Poway Road within the study area. As it was mentioned earlier in this memorandum, cross-sections B and E were analyzed under this scenario.

As shown in the Figures, intersection LOS within the Poway Road Corridor will degrade slightly with the implementation of both the Preferred Plan and Couplet Plan. However, both plans are projected to have similar vehicular intersection operations throughout the corridor. This is due to assuming the same land use plan, as well as having identical roadway configurations outside of the couplet area.

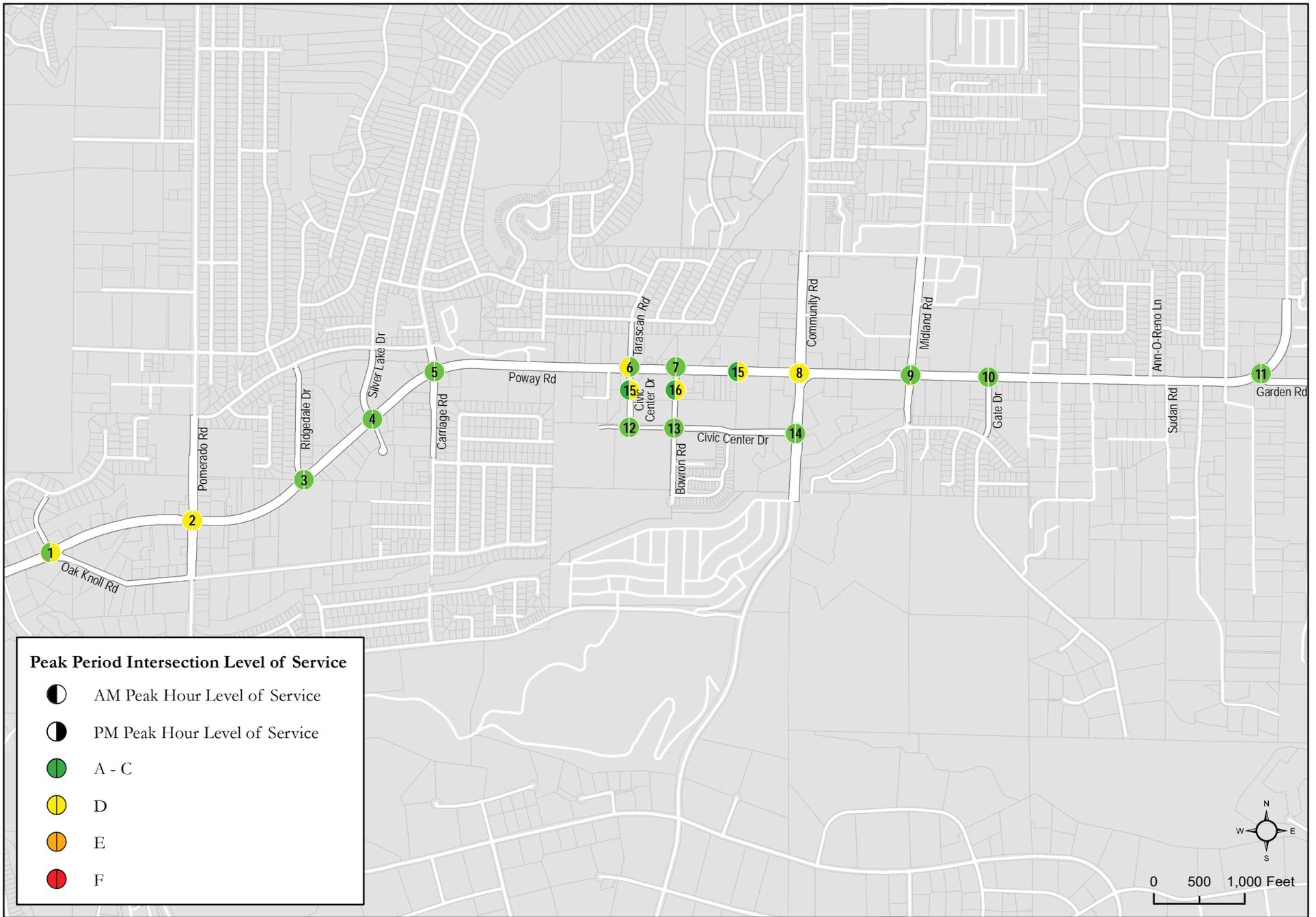


Figure 19
AM/PM Peak Hour Intersection Level of Service – Existing Conditions

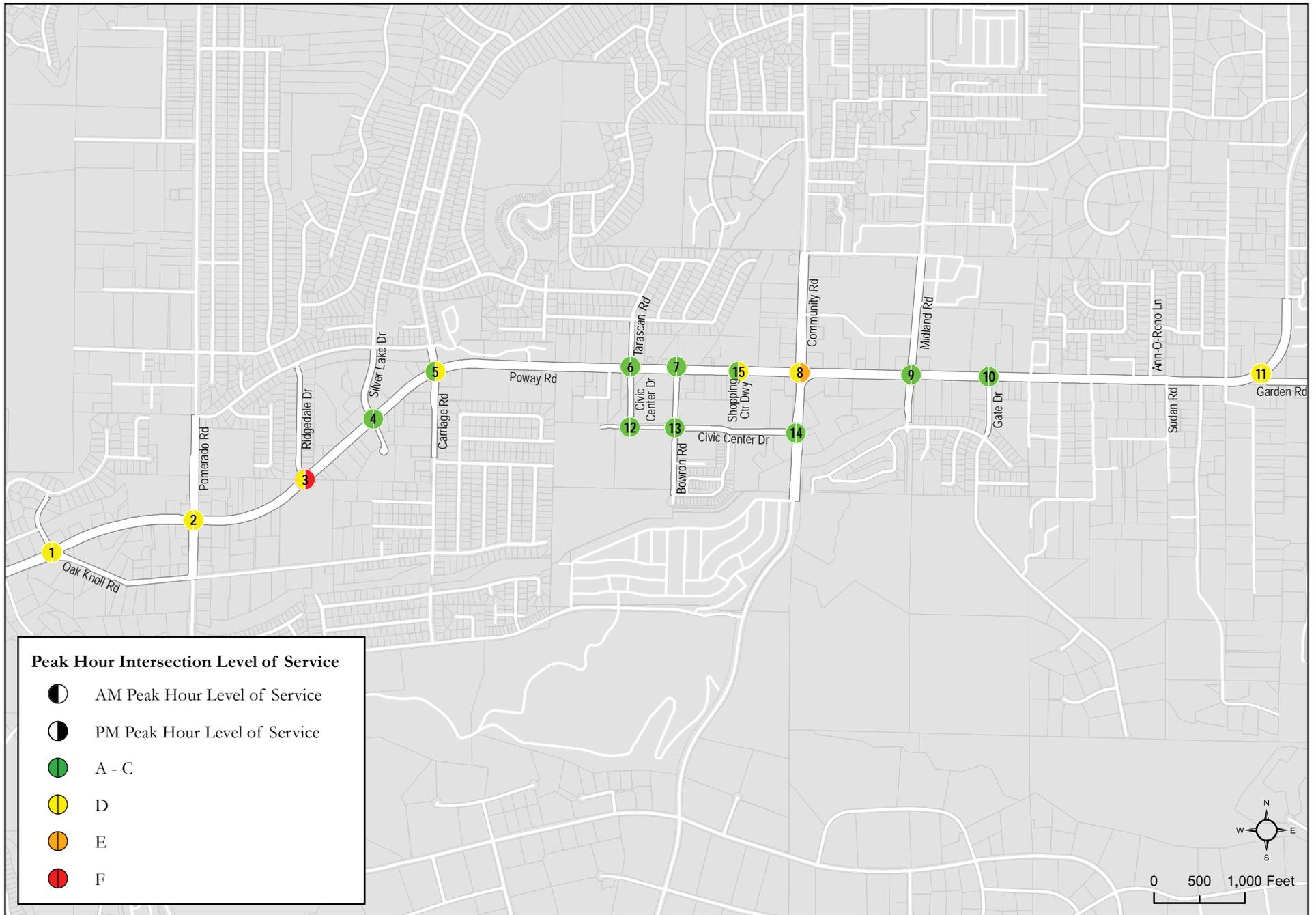


Figure 20
AM/PM Peak Hour Intersection Level of Service – Preferred Plan Conditions

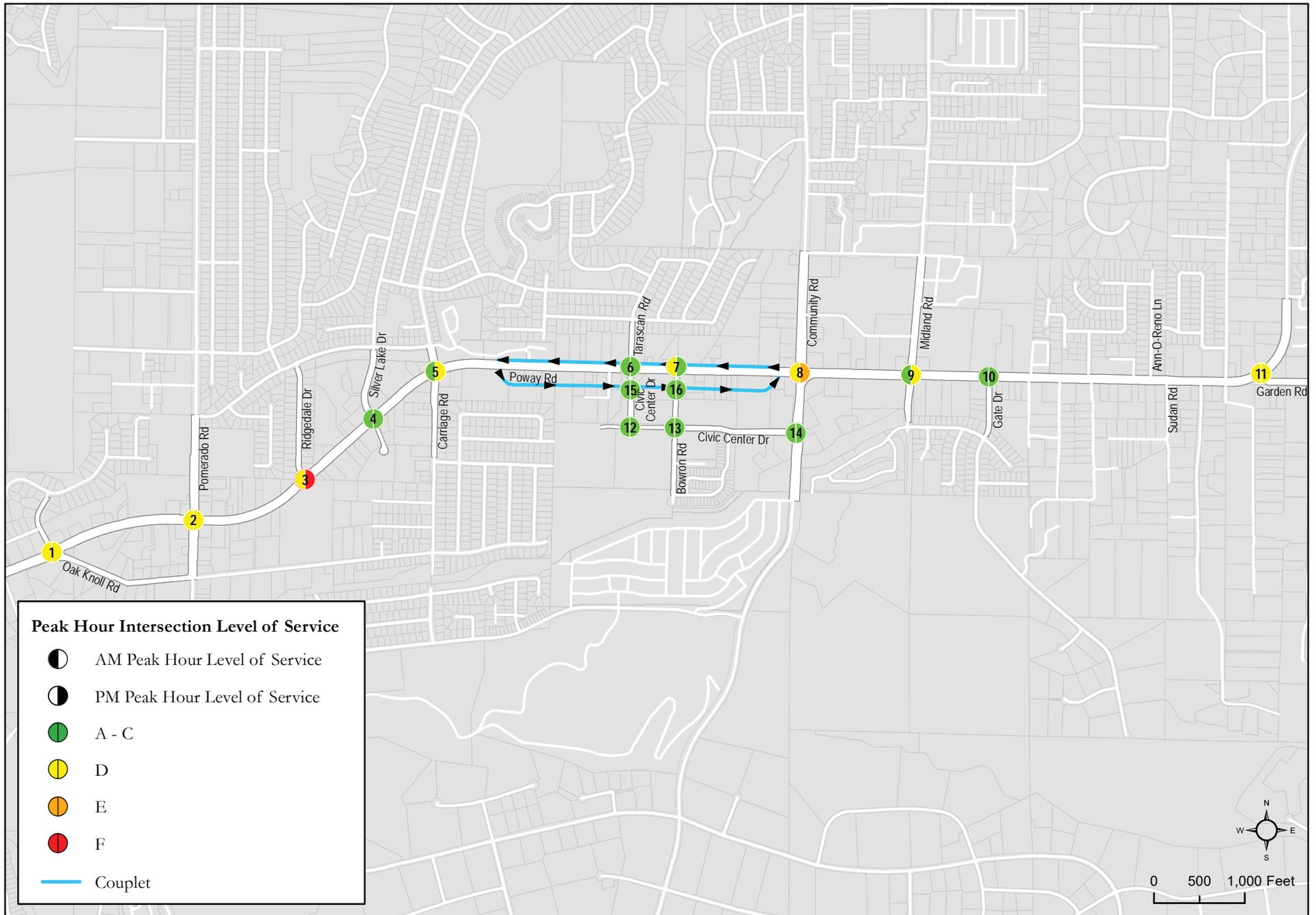


Figure 21
AM/PM Peak Hour Intersection Level of Service – Couplet Plan Conditions

Arterial LOS

Arterial LOS within the Poway Road Corridor was evaluated using the methodologies outlined in the 2010 Highway Capacity Manual. Arterial LOS is based on the projected travel speed along the study roadway segment. Roadway segment travel speed is projected based on the following factors:

- Intersection delay
- Roadway segment speed limit
- Roadway segment length

Existing Conditions – Figure 22 and Figure 23 display Arterial LOS during the AM and PM peak hour, respectively, along Poway Road within the study area.

Preferred Plan conditions – Figure 24 and Figure 25 display Intersection LOS during the AM and PM peak hour, respectively, along Poway Road within the study area. As it was mentioned earlier in this memorandum, cross-section B was analyzed under this scenario.

Couplet Plan Conditions – Figure 26 and Figure 27 display Arterial LOS during the AM and PM peak hour, respectively, along Poway Road within the study area. As it was mentioned earlier in this memorandum, cross-sections B and E were analyzed under this scenario.

As shown in the Figures, similar to the intersection LOS analysis results, the Arterial LOS throughout the corridor is anticipated to degrade with the implementation of either the Preferred or Couplet Plan. However, the roadway operations within the Couplet area is anticipated to improve significantly with the implementation of the Couplet Plan. This improvement in Arterial LOS is attributed to the directional separation of vehicular traffic along Poway Road, which significantly increases the capacity of the roadway due to enhanced intersection operations.

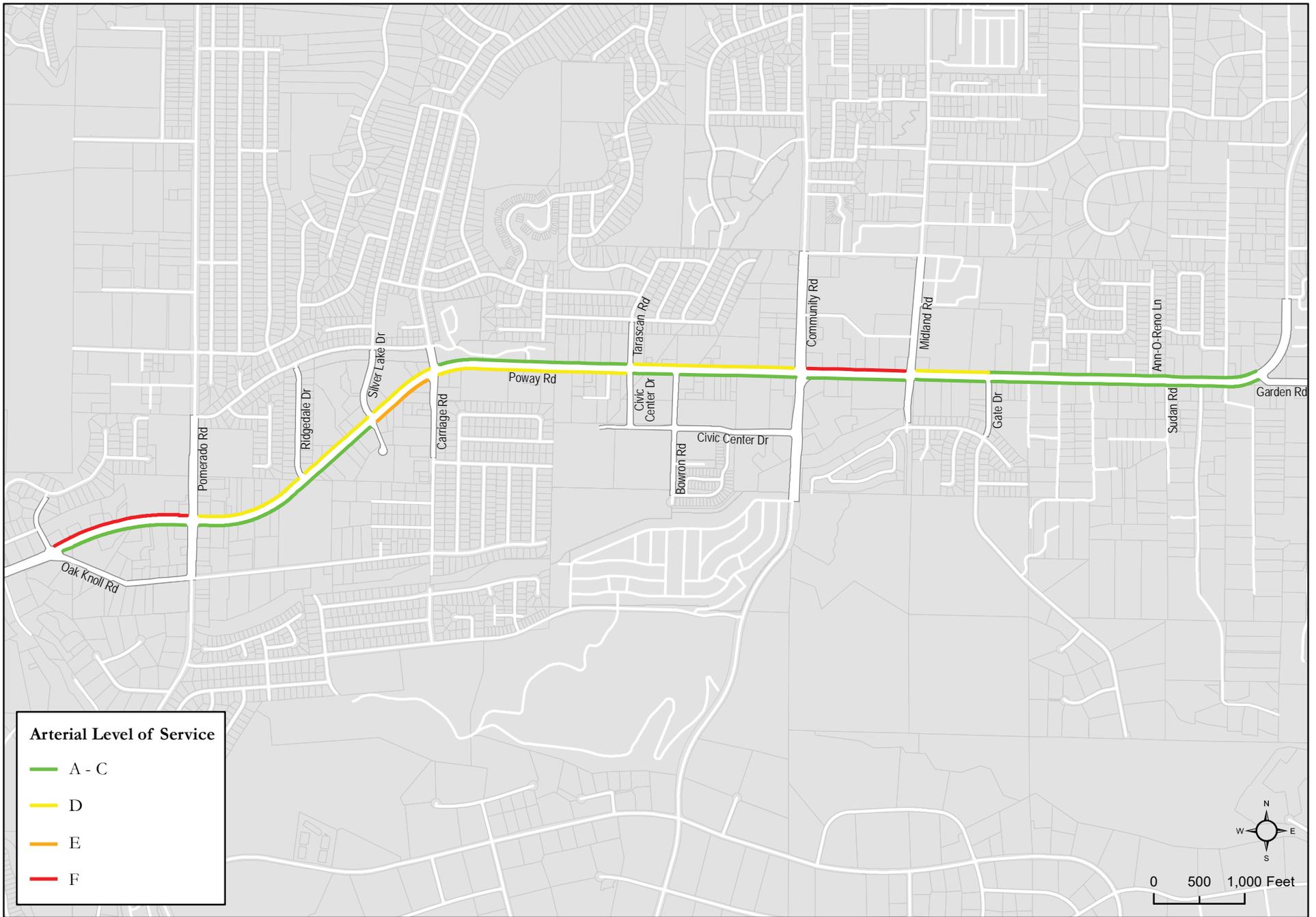


Figure 22
AM Peak Hour Arterial Level of Service – Existing Conditions

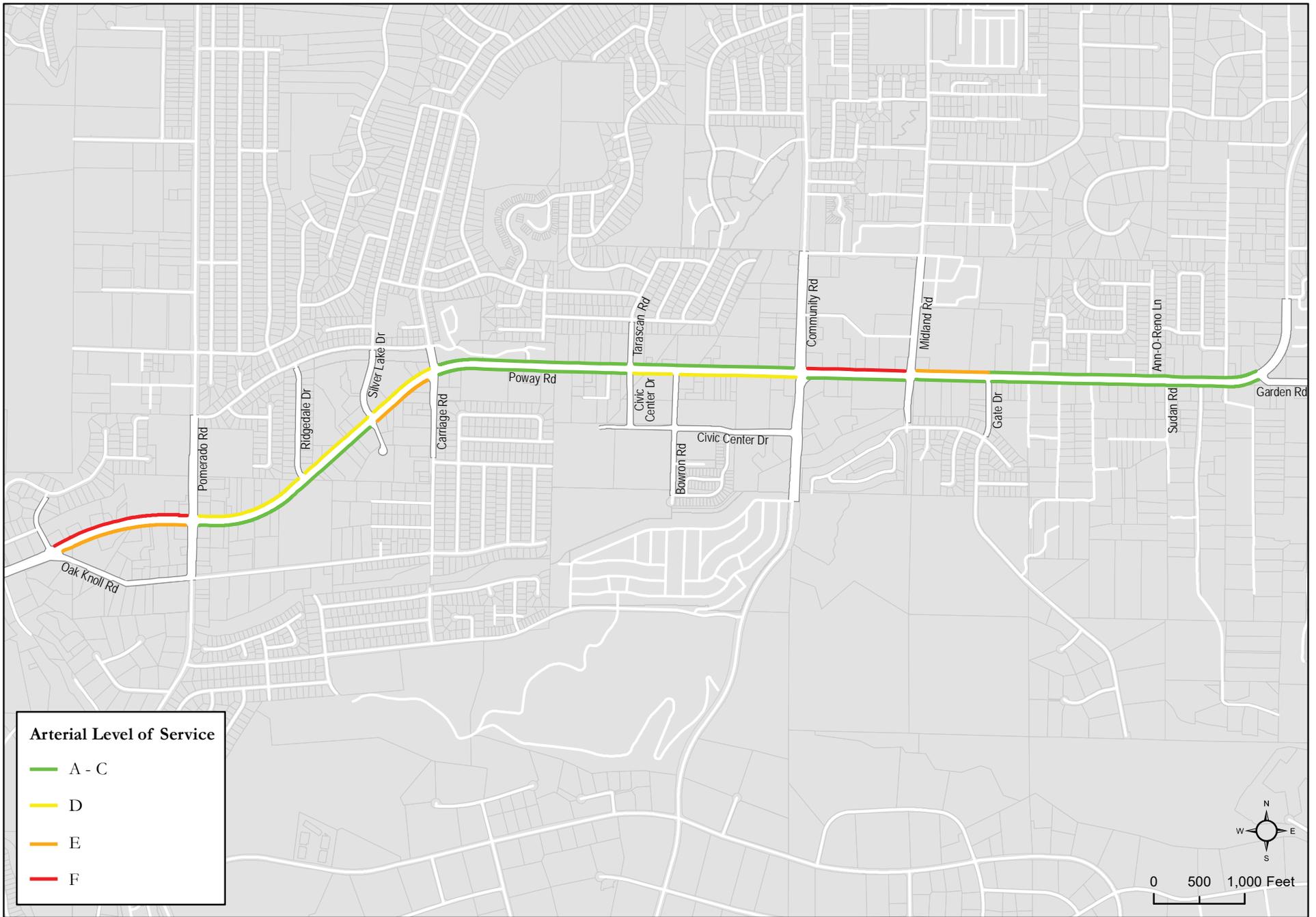


Figure 23
PM Peak Hour Arterial Level of Service – Existing Conditions

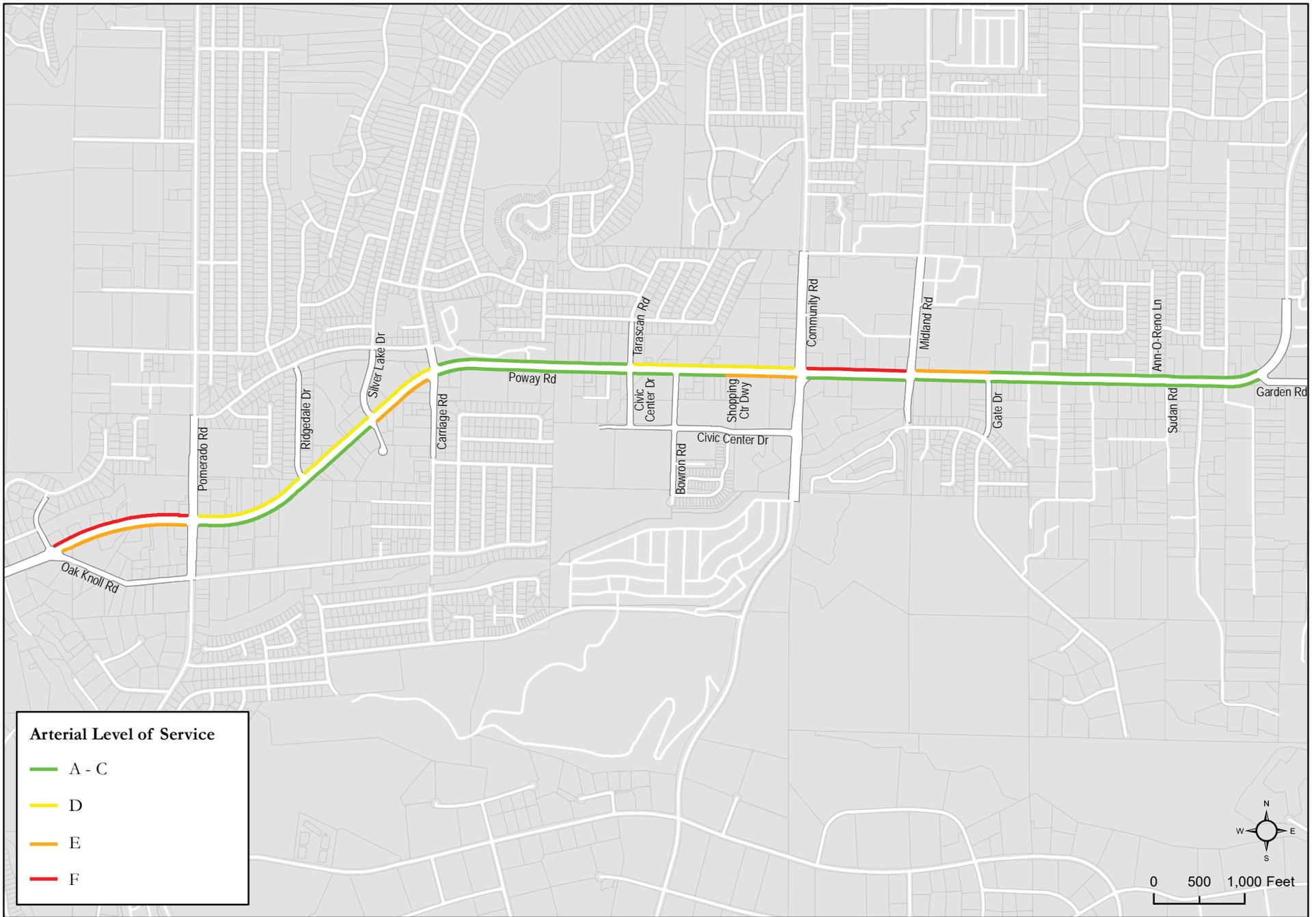


Figure 24
AM Peak Hour Arterial Level of Service – Preferred Plan Conditions

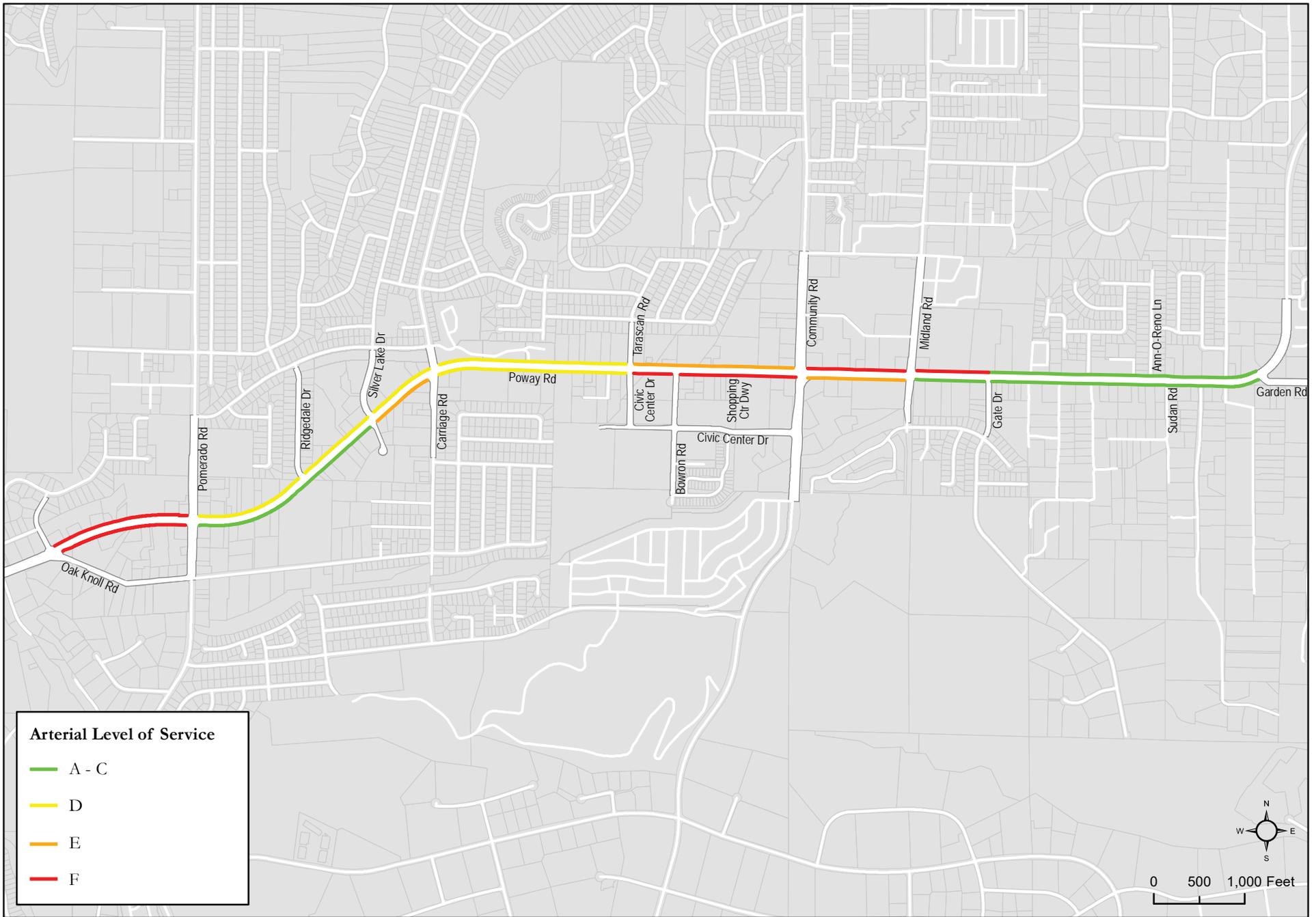


Figure 25
PM Peak Hour Arterial Level of Service – Preferred Plan Conditions

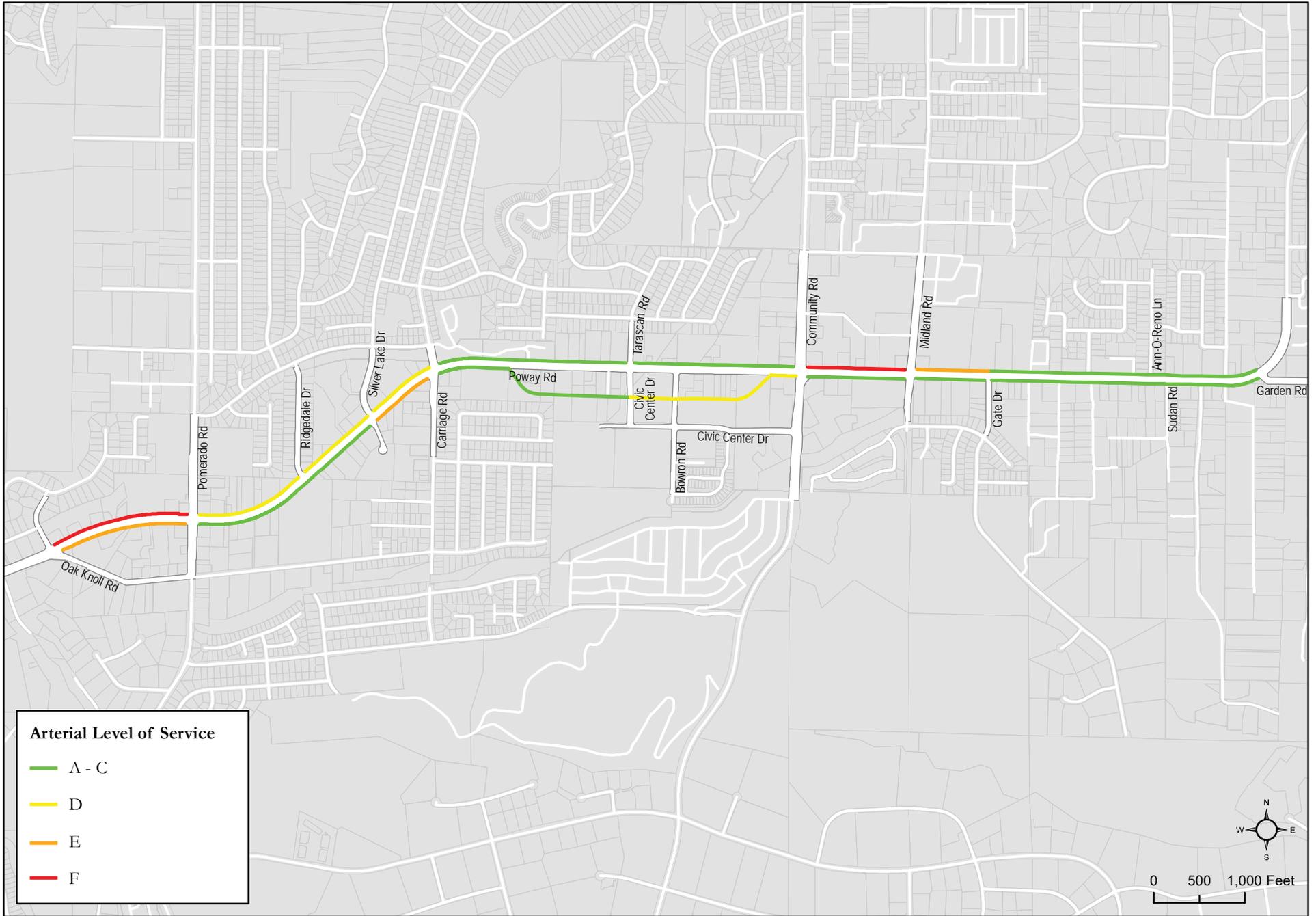


Figure 26
AM Peak Hour Arterial Level of Service – Couplet Plan Conditions

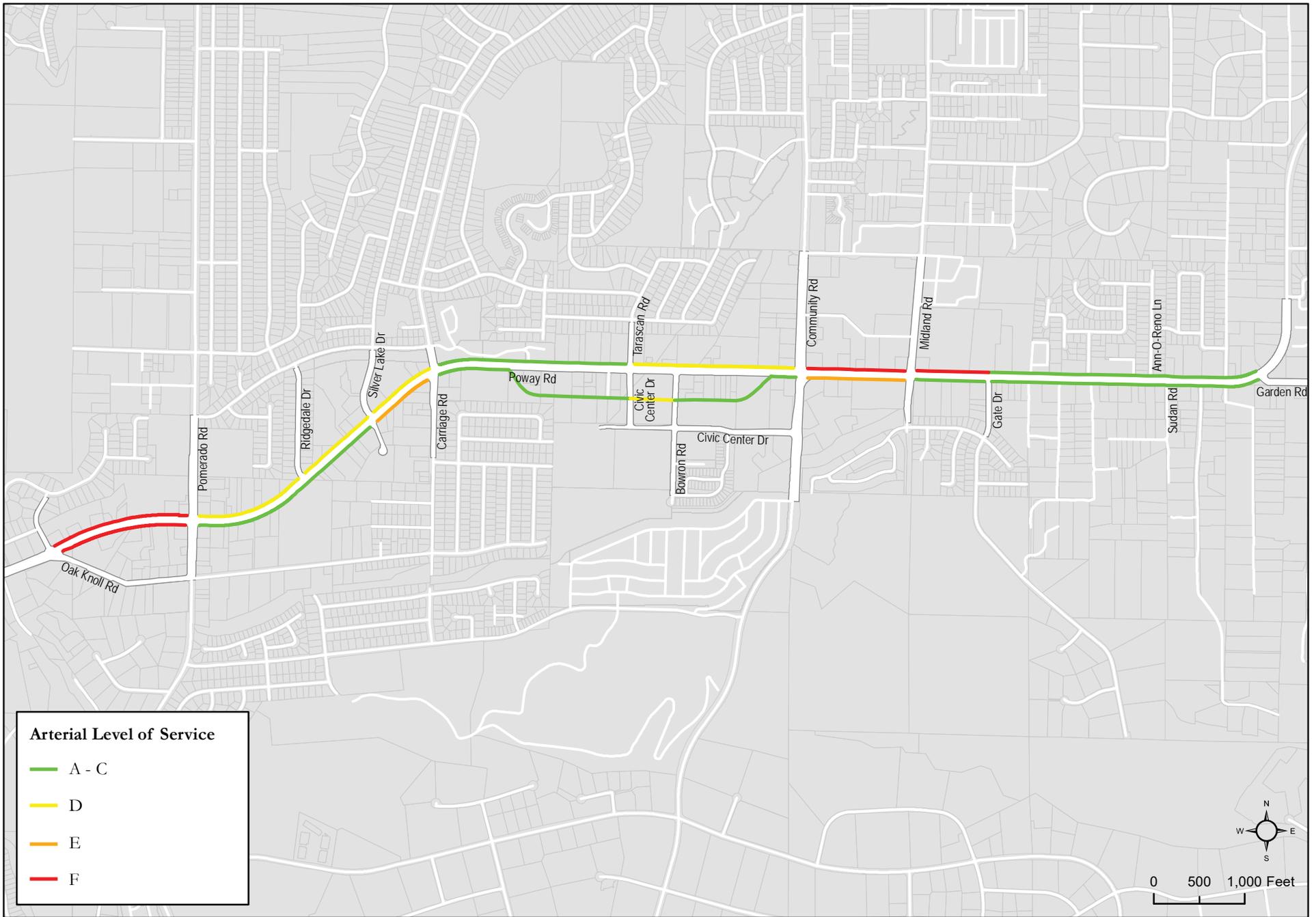
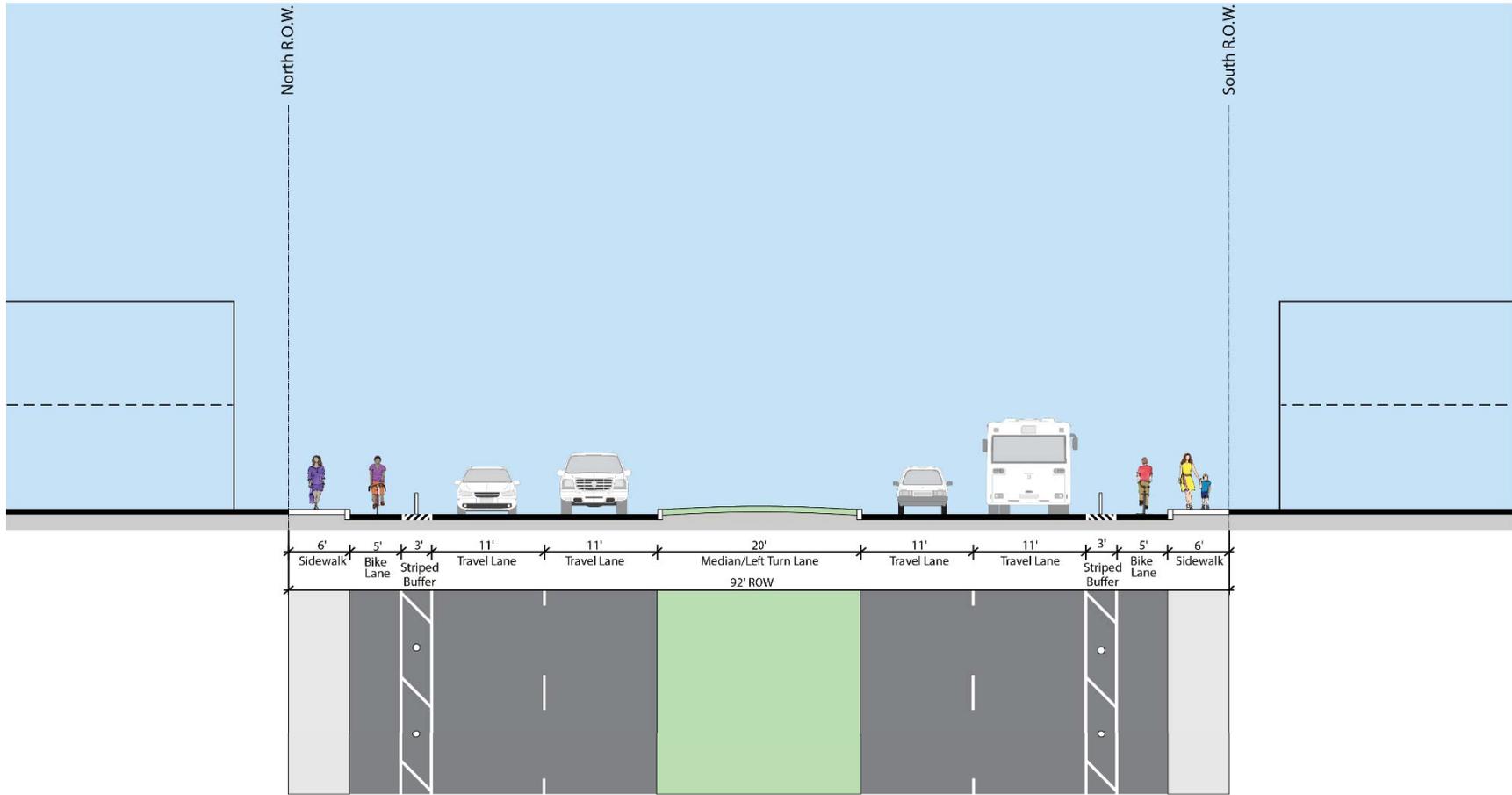


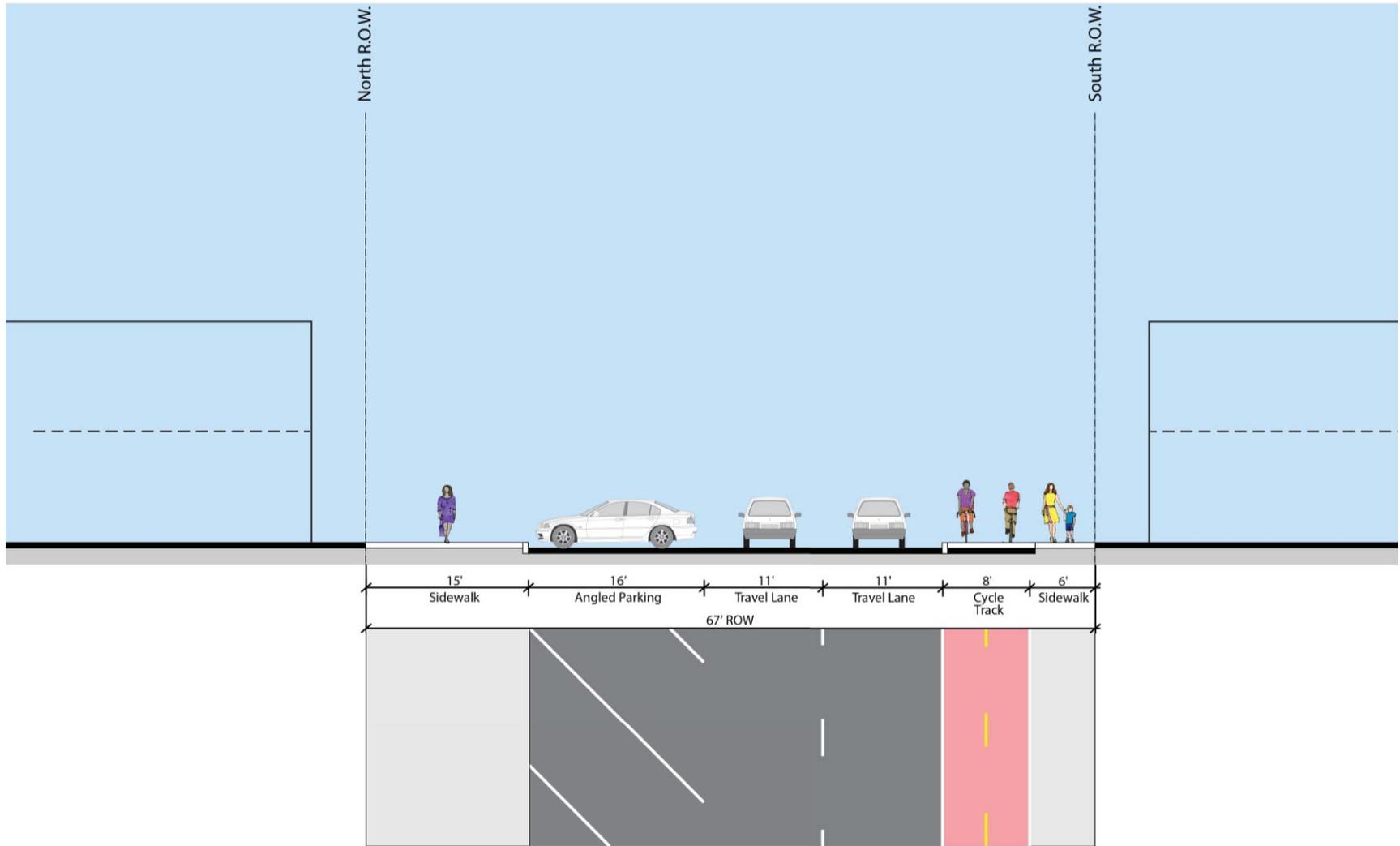
Figure 27
PM Peak Hour Arterial Level of Service – Couplet Plan Conditions

APPENDIX A

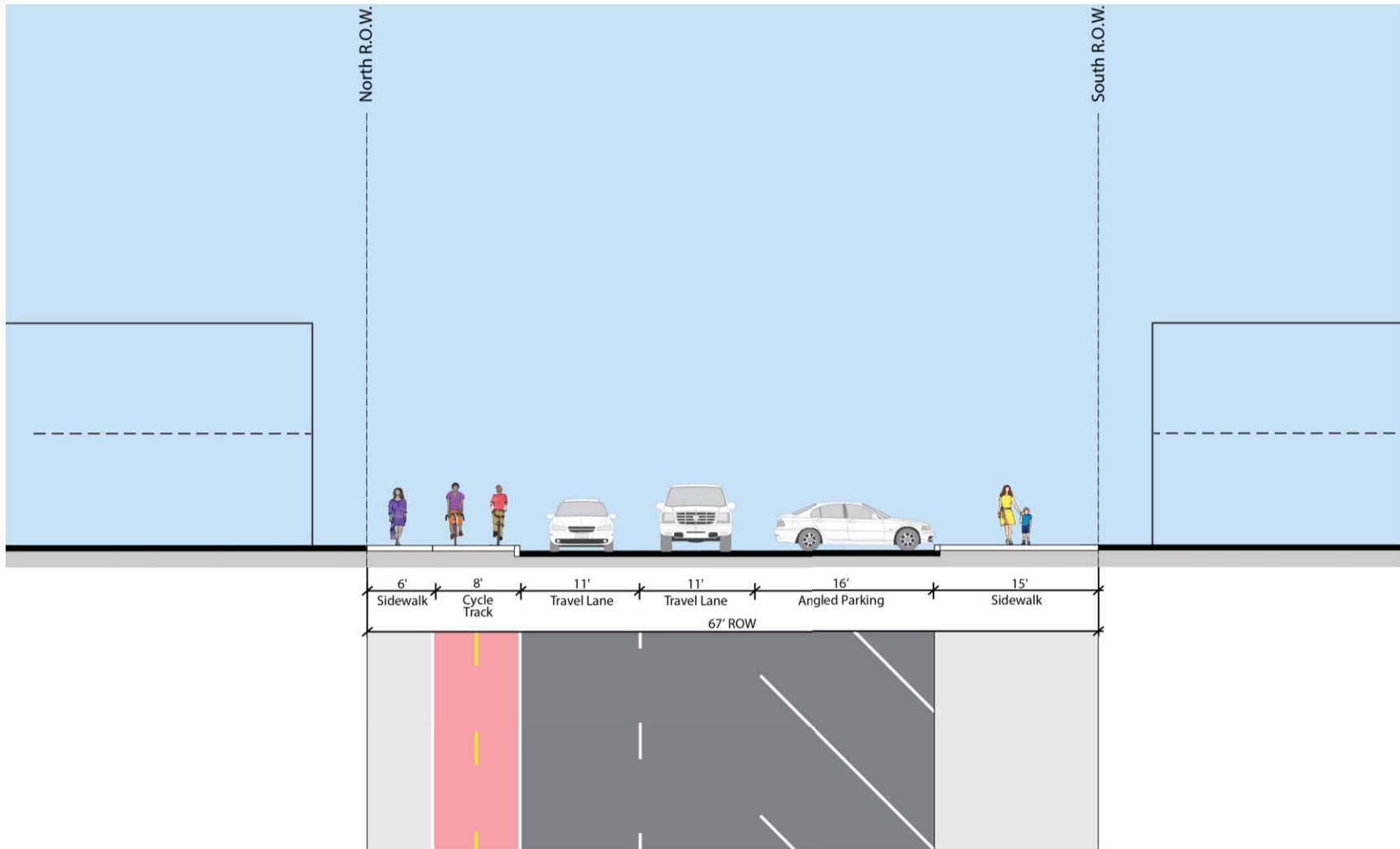
CROSS – SECTIONS



Poway Road – Oak Knoll Road to Fun Bowl and Community Road to Garden Road



Poway Road Eastbound Couplet – Fun Bowl to Community Road – Couplet Alternative Only



Poway Road Westbound Couplet – Fun Bowl to Community Road – Couplet Alternative Only

APPENDIX B

Land Use Plan

Proposed Land Use Plan 5-17-16



LAND USE

- Town Center
- Retail/Office
- Retail/Auto
- Residential/Retail
- Retail

BASE MAP FEATURES

- Corridor Study Area Boundary
- Opportunity Area Boundary
- Proposed Urban Trail
- Creeks
- Parks

