|                |        |        | Minor street        |                     |                     |                     |                        |               |                     |               |            |           |           |
|----------------|--------|--------|---------------------|---------------------|---------------------|---------------------|------------------------|---------------|---------------------|---------------|------------|-----------|-----------|
|                |        |        | Number              |                     |                     |                     | -                      |               |                     |               |            |           |           |
|                |        |        | through 2 4         |                     |                     |                     |                        |               |                     | 6             | 8          |           |           |
| Major street   |        |        | lanes:<br>Low AADT: | 0                   | 5,000               | 7,500               | 10,000                 | 10,000        | 15,000              | 20,000        |            |           |           |
| Number through | Low    | High   | LOW AAD1.           | U                   | 3,000               | 7,300               | 10,000                 | 10,000        | 13,000              | 20,000        | 25,000 and | Any       | Any       |
| lanes          | AADT   | AADT   | High AADT:          | 5,000               | 7,500               | 10,000              | 15,000                 | 15,000        | 20,000              | 25,000        | above      | 7 7       | 7 ,       |
| 2              | 0      | 5,000  | Safest              | All-way stop        | n/a                 | n/a                 | n/a                    | n/a           | n/a                 | n/a           | n/a        | n/a       | n/a       |
| -              | ŭ      | 3,000  | Juicot              | · ita, stop         | , a                 | .,, a               | , a                    | , a           | .,, a               | .,, a         | .,, a      | , a       | , ۵       |
|                |        |        | CMF                 | 0.3                 |                     |                     |                        |               |                     |               |            |           |           |
|                |        |        | Compare to          | Two-way stop        |                     |                     |                        |               |                     |               |            |           |           |
|                | 5,000  | 7,500  | Safest              | One-lane            | One-lane            | n/a                 | n/a                    | n/a           | n/a                 | n/a           | n/a        | n/a       | n/a       |
|                |        |        |                     | roundabout          | roundabout          |                     |                        |               |                     |               |            |           |           |
|                |        |        | CMF                 | 0.2                 | 0.4                 |                     |                        |               |                     |               |            |           |           |
|                |        |        | Compare to          | Two-way stop        | Signal              |                     |                        |               |                     |               |            |           |           |
|                | 7,500  | 10,000 | Safest              | One-lane            | One-lane            | One-lane            | n/a                    | n/a           | n/a                 | n/a           | n/a        | n/a       | n/a       |
|                |        |        |                     | roundabout          | roundabout          | roundabout          |                        |               |                     |               |            |           |           |
|                |        |        | CMF                 | 0.2                 | 0.4                 | 0.4                 |                        |               |                     |               |            |           |           |
|                |        |        | Compare to          | Two-way stop        | Signal              | Signal              |                        |               |                     |               |            |           |           |
|                | 10,000 | 15,000 | Safest              | One-lane            | One-lane            | One-lane            | One-lane               | n/a           | n/a                 | n/a           | n/a        | n/a       | n/a       |
|                |        |        |                     | roundabout          | roundabout          | roundabout          | roundabout*            |               |                     |               |            |           |           |
|                |        |        | CMF                 | 0.2                 | 0.4                 | 0.4                 | 0.4                    |               |                     |               |            |           |           |
|                |        |        | Compare to          | Two-way stop        | Signal              | Signal              | Signal                 |               |                     |               |            |           |           |
| 4              | 10,000 | 15,000 | Safest              | Unsignalized        | Unsignalized        | Unsignalized RCI    | Two-lane               | Two-lane      | n/a                 | n/a           | n/a        | n/a       | n/a       |
|                |        |        |                     | RCI                 | RCI                 |                     | roundabout             | roundabout    |                     |               |            |           |           |
|                |        |        | CMF                 | 0.4                 | 0.5                 | 0.5                 | 0.5                    | 0.5           |                     |               |            |           |           |
|                | 45.000 | 20.000 | Compare to          | Two-way stop        | Signal              | Signal              | Signal                 | Signal        |                     | ,             | ,          | ,         | ,         |
|                | 15,000 | 20,000 | Safest              | Unsignalized<br>RCI | Unsignalized<br>RCI | Two-lane roundabout | Two-lane<br>roundabout | Two-lane      | Two-lane roundabout | n/a           | n/a        | n/a       | n/a       |
|                |        |        | CMF                 | _                   | 0.5                 |                     |                        | roundabout    |                     |               |            |           |           |
|                |        |        | Compare to          | 0.4<br>Two-way stop | Signal              | 0.5<br>Signal       | 0.5<br>Signal          | 0.5<br>Signal | 0.5<br>Signal       |               |            |           |           |
|                | 20.000 | 25,000 | Safest              | Unsignalized        | Two-lane            | Two-lane            | Two-lane               | Two-lane      | Two-lane            | Two-lane      | n/a        | n/a       | n/a       |
|                | 20,000 | 23,000 | Jaiest              | RCI                 | roundabout          | roundabout          | roundabout             | roundabout    | roundabout          | roundabout**  | II/a       | 11/a      | 11/a      |
|                |        |        | CMF                 | 0.4                 | 0.5                 | 0.5                 | 0.5                    | 0.5           | 0.5                 | 0.5           |            |           |           |
|                |        |        | Compare to          | Two-way stop        | Signal              | Signal              | Signal                 | Signal        | Signal              | Signal        |            |           |           |
|                | 25.000 | 30,000 | Safest              | Unsignalized        | Two-lane            | Two-lane            | Two-lane               | Two-lane      | Two-lane            | Median u-turn | Median u-  | n/a       | n/a       |
|                | ,      | ,      |                     | RCI                 | roundabout          | roundabout          | roundabout             | roundabout    | roundabout**        |               | turn       | .,,-      | .,,=      |
|                |        |        | CMF                 | 0.4                 | 0.5                 | 0.5                 | 0.5                    | 0.5           | 0.5                 | 0.7           | 0.7        |           |           |
|                |        |        | Compare to          | Two-way stop        | Signal              | Signal              | Signal                 | Signal        | Signal              | Signal        | Signal     |           |           |
|                | 30,00  | 0 and  | Safest              | Unsignalized        | Two-lane            | Two-lane            | Two-lane               | Two-lane      |                     | Median u-turn | Median u-  | n/a       | n/a       |
|                | above  |        |                     | RCI                 | roundabout**        | roundabout**        | roundabout**           | roundabout**  |                     |               | turn       | ,         | ,         |
|                |        |        | CMF                 | 0.4                 | 0.5                 | 0.5                 | 0.5                    | 0.5           | 0.7                 | 0.7           | 0.7        |           |           |
|                |        |        | Compare to          | Two-way stop        | Signal              | Signal              | Signal                 | Signal        | Signal              | Signal        | Signal     |           |           |
| 6              | Any    |        | Safest              | Unsignalized        | Median u-turn       | Median u-turn       | Median u-turn          | -             | Median u-turn       | Median u-turn | Median u-  | Median u- | n/a       |
|                |        | ,      |                     | RCI                 |                     |                     |                        |               |                     |               | turn       | turn      |           |
|                |        |        | CMF                 | 0.4                 | 0.7                 | 0.7                 | 0.7                    | 0.7           | 0.7                 | 0.7           | 0.7        | 0.7       |           |
|                |        |        | Compare to          | Two-way stop        | Signal              | Signal              | Signal                 | Signal        | Signal              | Signal        | Signal     | Signal    |           |
| 8              | Ar     | ny     | Safest              | Unsignalized        | Median u-turn       | Median u-turn       | Median u-turn          | Median u-turn | Median u-turn       | Median u-turn | Median u-  | Median u- | Median u- |
|                | ,      |        |                     | RCI                 |                     |                     |                        |               |                     |               | turn       | turn      | turn      |
|                |        |        | CMF                 | 0.4                 | 0.7                 | 0.7                 | 0.7                    | 0.7           | 0.7                 | 0.7           | 0.7        | 0.7       | 0.7       |
|                |        |        | Compare to          | Two-way stop        | Signal              | Signal              | Signal                 | Signal        | Signal              | Signal        | Signal     | Signal    | Signal    |

<sup>\*</sup> One-lane roundabouts are generally feasible if the combined AADT is less than 25,000. If a one-lane roundabout is infeasible a signal is the safest feasible design.

<sup>\*\*</sup> Two-lane roundabouts are generally feasible if the combined AADT is less than 45,000. If a two-lane roundabout is infeasible a median u-turn is the safest feasible design.

|                |        |        |            |                     |                     |                     | Mino                    | or street      |                |                |                   |           |           |
|----------------|--------|--------|------------|---------------------|---------------------|---------------------|-------------------------|----------------|----------------|----------------|-------------------|-----------|-----------|
|                |        |        | Number     |                     |                     |                     |                         |                |                |                |                   |           |           |
|                |        |        | through    |                     |                     |                     |                         | 4              |                |                |                   |           | 8         |
|                |        |        | lanes:     |                     |                     |                     |                         |                |                |                |                   |           |           |
| Major street   |        |        | Low AADT:  | 0                   | 5,000               | 7,500               | 10,000                  | 10,000         | 15,000         | 20,000         | 25,000 and        |           |           |
| Number through | Low    | High   |            |                     |                     |                     |                         |                |                |                | above             | Any       | Any       |
| lanes          | AADT   | AADT   | High AADT: | 5,000               | 7,500               | 10,000              | 15,000                  | 15,000         | 20,000         | 25,000         |                   |           |           |
| 2              | 0      | 5,000  | Safest     | All-way stop        | n/a                 | n/a                 | n/a                     | n/a            | n/a            | n/a            | n/a               | n/a       | n/a       |
|                |        |        | CMF        | 0.3                 |                     |                     |                         |                |                |                |                   |           |           |
|                |        |        | Compare to | Two-way stop        |                     |                     |                         |                |                |                |                   |           |           |
|                | 5,000  | 7,500  | Safest     | All-way stop        | All-way stop        | n/a                 | n/a                     | n/a            | n/a            | n/a            | n/a               | n/a       | n/a       |
|                |        |        | CMF        | 0.3                 | 0.3                 |                     |                         |                |                |                |                   |           |           |
|                |        |        | Compare to | Two-way stop        | Two-way stop        |                     |                         |                |                |                |                   |           |           |
|                | 7,500  | 10,000 | Safest     | One-lane            | One-lane            | One-lane            | n/a                     | n/a            | n/a            | n/a            | n/a               | n/a       | n/a       |
|                |        |        |            | roundabout          | roundabout          | roundabout          |                         |                |                |                |                   |           |           |
|                |        |        | CMF        | 0.5                 | 0.6                 | 0.6                 |                         |                |                |                |                   |           |           |
|                |        |        | Compare to | Two-way stop        | Signal              | Signal              |                         |                |                |                |                   |           |           |
|                | 10,000 | 15,000 | Safest     | One-lane roundabout | One-lane roundabout | One-lane roundabout | One-lane<br>roundabout* | n/a            | n/a            | n/a            | n/a               | n/a       | n/a       |
|                |        |        | CMF        | 0.5                 | 0.6                 | 0.6                 | 0.6                     |                |                |                |                   |           |           |
|                |        |        | Compare to | Two-way stop        | Signal              | Signal              | Signal                  |                |                |                |                   |           |           |
| 4              | 10,000 | 15,000 | Safest     | Unsignalized        | Unsignalized        | Unsignalized RCI    | Signalized RCI          | Signalized RCI | n/a            | n/a            | n/a               | n/a       | n/a       |
|                |        |        |            | RCI                 | RCI                 |                     |                         |                |                |                |                   |           |           |
|                |        |        | CMF        | 0.6                 | 0.8                 | 0.8                 | 0.8                     | 0.8            |                |                |                   |           |           |
|                |        |        | Compare to | Two-way stop        | Signal              | Signal              | Signal                  | Signal         |                |                |                   |           |           |
|                | 15,000 | 20,000 | Safest     | Unsignalized        | Unsignalized        | Signalized RCI      | Signalized RCI          | Signalized RCI | Signalized RCI | n/a            | n/a               | n/a       | n/a       |
|                |        |        |            | RCI                 | RCI                 |                     |                         |                |                |                |                   |           |           |
|                |        |        | CMF        | 0.6                 | 0.8                 | 0.8                 | 0.8                     | 0.8            | 0.8            |                |                   |           |           |
|                |        |        | Compare to | Two-way stop        | Signal              | Signal              | Signal                  | Signal         | Signal         |                |                   |           |           |
|                | 20,000 | 25,000 | Safest     | Unsignalized<br>RCI | Signalized RCI      | Signalized RCI      | Signalized RCI          | Signalized RCI | Signalized RCI | Signalized RCI | n/a               | n/a       | n/a       |
|                |        |        | CMF        | 0.6                 | 0.8                 | 0.8                 | 0.8                     | 0.8            | 0.8            | 0.8            |                   |           |           |
|                |        |        | Compare to | Two-way stop        | Signal              | Signal              | Signal                  | Signal         | Signal         | Signal         |                   |           |           |
|                | 25,000 | 30,000 | Safest     | Unsignalized<br>RCI | Signalized RCI      | Signalized RCI      | Signalized RCI          | Signalized RCI | Signalized RCI | Signalized RCI | Median u-<br>turn | n/a       | n/a       |
|                |        |        | CMF        | 0.6                 | 0.8                 | 0.8                 | 0.8                     | 0.8            | 0.8            | 0.8            | 0.8               |           |           |
|                |        |        | Compare to | Two-way stop        | Signal              | Signal              | Signal                  | Signal         | Signal         | Signal         | Signal            |           |           |
|                | 30,00  | 0 and  | Safest     | Unsignalized        | Signalized RCI      | Signalized RCI      | Signalized RCI          | Signalized RCI | Signalized RCI | Signalized RCI | Median u-         | n/a       | n/a       |
|                | abo    |        |            | RCI                 |                     |                     | <b>-</b>                |                |                |                | turn              |           |           |
|                |        |        | CMF        | 0.6                 | 0.8                 | 0.8                 | 0.8                     | 0.8            | 0.8            | 0.8            | 0.8               |           |           |
|                |        |        | Compare to | Two-way stop        | Signal              | Signal              | Signal                  | Signal         | Signal         | Signal         | Signal            |           |           |
| 6              | Ar     | ıy     | Safest     | Unsignalized        | Signalized RCI      | Signalized RCI      | Signalized RCI          | Signalized RCI | Signalized RCI | Signalized RCI | Median u-         | Median u- | n/a       |
|                |        |        |            | RCI                 |                     |                     |                         |                |                |                | turn              | turn      |           |
|                | Any    |        | CMF        | 0.6                 | 0.8                 | 0.8                 | 0.8                     | 0.8            | 0.8            | 0.8            | 0.8               | 0.8       |           |
|                |        |        | Compare to | Two-way stop        | Signal              | Signal              | Signal                  | Signal         | Signal         | Signal         | Signal            | Signal    |           |
| 8              |        |        | Safest     | Unsignalized        | Signalized RCI      | Signalized RCI      | Signalized RCI          | Signalized RCI | Signalized RCI | Signalized RCI | Median u-         | Median u- | Median u- |
|                |        |        |            | RCI                 | _                   | _                   | _                       |                | _              | _              | turn              | turn      | turn      |
|                |        | CMF    | 0.6        | 0.8                 | 0.8                 | 0.8                 | 0.8                     | 0.8            | 0.8            | 0.8            | 0.8               | 0.8       |           |
|                |        |        | Compare to | Two-way stop        | Signal              | Signal              | Signal                  | Signal         | Signal         | Signal         | Signal            | Signal    | Signal    |

<sup>\*</sup> One-lane roundabouts are generally feasible if the combined AADT is less than 25,000. If a one-lane roundabout is infeasible a signal is the safest feasible design.

## Safest feasible intersection design (SaFID) Hummer, NCDOT, 10/11/19, jehummer@ncdot.gov

## Considering injury and all crashes

|                      |                     | Ī            | Minor street                |   |   |   |   |   |   |   |                   |                   |                   |
|----------------------|---------------------|--------------|-----------------------------|---|---|---|---|---|---|---|-------------------|-------------------|-------------------|
|                      |                     |              | Number<br>through<br>lanes: | 2 4                                       |   |   |   |   |   | 6   | 8                 |                   |                   |
| Major street         |                     | Low AADT:    | 0                           | 5,000                                     | 7,500   | 10,000  | 10,000  | 15,000  | 20,000  | 25,000 and  |                   |                   |                   |
| Number through lanes | Low<br>AADT         | High<br>AADT | High AADT:                  | 5,000                                     | 7,500   | 10,000  | 15,000  | 15,000  | 20,000  | 25,000  | above             | Any               |                   |
| 2                    | 0                   | 5,000        |                             | All-way stop                              | n/a   | n/a   | n/a   | n/a   | n/a   | n/a   | n/a               | n/a               | n/a               |
|                      | 5,000               | 7,500        |                             | One-lane<br>roundabout or<br>all-way stop | One-lane<br>roundabout or all-<br>way stop                      | n/a   | n/a   | n/a   | n/a   | n/a   | n/a               | n/a               | n/a               |
|                      | 7,500               | 10,000       |                             | One-lane<br>roundabout                    | One-lane roundabout   | One-lane roundabout   | n/a   | n/a   | n/a   | n/a   | n/a               | n/a               | n/a               |
|                      | 10,000              | 15,000       |                             | One-lane<br>roundabout                    | One-lane roundabout   | One-lane roundabout   | Signal or one-lane roundabout                                   | n/a   | n/a   | n/a   | n/a               | n/a               | n/a               |
| 4                    | 10,000              | 15,000       |                             | Unsignalized<br>RCI                       | Unsignalized RCI  | Unsignalized RCI  | Two-lane roundabout or signalized RCI                           | Two-lane<br>roundabout or<br>signalized RCI                     | n/a   | n/a   | n/a               | n/a               | n/a               |
|                      | 15,000              | 20,000       |                             | Unsignalized<br>RCI                       | Unsignalized RCI  | Two-lane roundabout or signalized RCI                           | Two-lane roundabout or signalized RCI                           | Two-lane<br>roundabout or<br>signalized RCI                     | Two-lane roundabout or signalized RCI                           | n/a   | n/a               | n/a               | n/a               |
|                      | 20,000              | 25,000       |                             | Unsignalized<br>RCI                       | Two-lane roundabout or signalized RCI                           | Two-lane<br>roundabout or<br>median u-turn or<br>signalized RCI | n/a               | n/a               | n/a               |
|                      | 25,000              | 30,000       |                             | Unsignalized<br>RCI                       | Two-lane<br>roundabout or<br>signalized RCI                     | Two-lane<br>roundabout or<br>signalized RCI                     | Two-lane roundabout or signalized RCI                           | Two-lane<br>roundabout or<br>signalized RCI                     | Two-lane<br>roundabout or<br>median u-turn or<br>signalized RCI | Median u-turn or<br>signalized RCI                              | Median u-<br>turn | n/a               | n/a               |
|                      | 30,000 and<br>above |              |                             | Unsignalized<br>RCI                       | Two-lane<br>roundabout or<br>median u-turn or<br>signalized RCI | Median u-turn or<br>signalized RCI                              | Median u-turn or<br>signalized RCI                              | Median u-<br>turn | n/a               | n/a               |
| 6                    | Αr                  | пу           |                             | Unsignalized<br>RCI                       | Median u-turn or<br>signalized RCI                              | Median u-<br>turn | Median u-<br>turn | n/a               |
| 8                    | Aı                  | ny           |                             | Unsignalized<br>RCI                       | Median u-turn or<br>signalized RCI                              | Median u-<br>turn | Median u-<br>turn | Median u-<br>turn |

If a cell lists one design, that design is safest for injury and all crashes. If a cell lists two designs, the first design listed is safest for injury crashes and the second design listed is safest for all crashes. If a cell lists three designs, the first two are safest for injury crashes and the third is safest for all crashes.

<sup>&</sup>quot;n/a" means not applicable because the minor street volume is larger than the major street volume or because the minor street has more lanes than the major street.