

CHAPTER I - STREETS

SECTION 1. - General:

1. Unless otherwise specified by City ordinance, Standard Specifications and Details for Public Works Construction or items in this chapter, design of all streets and related improvements shall conform to the following: "Guidelines For Urban Major Street Design," published by the Institute of Transportation Engineers (ITE), and American Association of State Highway Transportation Officials (AASHTO) "A Policy on Geometric Designs of Highways and Streets", latest editions. The more restrictive standard shall prevail for design.
2. Street widths and alignments shall generally conform to the adopted City of Reno Master Plan, RTC RTP 2030, and elements thereof. All streets and alleys within a subdivision or development, shall be improved and conform to City standards. Additional right-of-way shall be provided near intersections as required by the City Engineer in order to facilitate turning movements. It will be the responsibility of the applicant or permittee to show compliance with any approvals including S.U.P., P.U.D., Transit Oriented Corridors, etc. Dedications will be required of any project shown on the 2012 RTP and easements will be required for any area shown on the 2040 RTP.
3. At least two separate points of ingress and egress to City standards shall be provided to serve a subdivision or development unless otherwise approved by the City Engineer with concurrence by the Fire Chief. Road widths can be impacted by the needs or requirements of the Fire Department.
4. Streets or access facilities that form a boundary to or are necessary to serve the subdivision or development which are not within the boundaries of the subdivision or development shall be improved with development to standards required by the City Engineer to promote public safety and welfare.
5. All necessary right-of-way or easement acquisition outside the boundaries of a subdivision or development, including any agreements as to access, ownership and maintenance, shall be completed prior to approval of a final map or prior to the issuance of any building permit for a development, whichever is first.
6. Unless otherwise required by an adopted or existing street pattern or indicated as such on the master plan, streets shall not be located along property boundaries. Unless otherwise approved by the City Engineer, a proposed street lying along a boundary of a subdivision or development is to be dedicated and constructed full width to City standards. Half streets may not be permitted along property lines unless they are in accordance

with an adopted street pattern and have been approved by the City Engineer.

7. Should half streets be permitted, they shall be distinctly designated upon the plans as being a portion only of a street and not a street of full width. Whenever a dedicated and recorded half street exists adjoining a proposed subdivision or development, the other half street must be dedicated and constructed with the proposed subdivision or development to make the street complete. When a half street is permitted along the boundary of a subdivision or development, it shall be improved half width, but in no instance shall the paved travel way be less than 24 feet in width (with no parking). Curb, gutter, sidewalk, and streetlights adjacent to the subdivision or development with a minimum 2 foot shoulder opposite shall be provided. Provisions for cut and/or fill slopes along the shoulder and any necessary sanitary sewer, storm drain or utility extensions, shall be provided and constructed to City standards. Whenever a one-half street is permitted, a 2"x 6" redwood header shall be placed along the open pavement edge, or a one foot minimum additional width shall be added to the pavement for a future saw cut line.
8. Streets shall be extended to the subdivision/development boundary for future development unless otherwise approved by the City Engineer. Streets extending to the subdivision or development boundary which are proposed for future extension and exceed 150 feet in length or more than one lot in depth are to be provided with temporary cul-de-sacs or looped emergency access road to City standards. The future removal of such cul-de-sac or emergency access road and its replacement to full width City standard street improvements must be provided with the extension of the street by future development.
9. Street design shall conform to standard details and be based on the design subgrade resilience modulus (R-value) shown in the soils report prepared by a Nevada licensed Civil Engineer, submitted with the improvement drawings. All soils report recommendations are to be incorporated into the plans and borings to be shown on plans. CTB, lime and geotextile stabilization shall not be allowed.
10. All boring and test pit logs shall be incorporated into the plans. Where ground water is encountered, the elevation of ground water shall be indicated in all profiles. Where percolation or flooding basin tests have been performed, they shall also be indicated in all profiles.
11. To prevent damage to structures due to storm waters over-topping the curb, building pads (finish grade) shall be set a minimum of one foot above the top of curb located at the point of primary access, or drainage around building pads shall be designed such that no building shall be subject to flooding as a result of storm waters over-topping the curb or driveway

approach along any public or private street. Where ponding for infiltration is allowed for LID features external to the curb and gutter, the maximum elevation of ponded water shall also be considered. Additional easements or ROW may be required.

SECTION 2. - Design Requirements:

1. All streets shall have a minimum grade of 0.6%, unless approved otherwise by the City Engineer. Commercial collector, arterial and expressway streets shall have a maximum grade of 6.0%, except as noted in item 1a below. It is desirable to have a maximum grade of 6.0% on residential collector and local streets. If approved by the City Engineer, residential collector and local streets with a northern exposure are allowed a maximum grade of 10.0% and residential collector and local streets with a southern exposure a maximum grade of 12.0%. The following criteria shall also apply to street grades for all functional classifications.
 - a. Grades in excess of 8.0% shall be limited to a horizontal tangent length of 400 feet. Grades in excess of 10.0% shall be limited to a horizontal tangent length of 200 feet. Street segments with grades in excess of 8.0% shall provide landings contiguous to both sides of the steeper section. Each landing shall have a grade of 6.0% or less, and a length of at least 100 feet.
 - b. On long grades, the steeper grades shall be provided near the bottom of the ascent wherever possible, with shallower grades near the top of the ascent.
 - c. Street intersections shall not be allowed when the grade on the primary street exceeds 6.0% on streets with a northern exposure and 8.0% on streets with a southern exposure.
 - d. Design controls for vertical curves shall conform to AASHTO's "A Policy on Geometric Design of Highways and Streets", Latest Edition.
 - e. Sharp horizontal curvature shall not be introduced at or near the top of a pronounced crest vertical curve or near the bottom of a pronounced sag vertical curve. Consideration shall be given for stopping sight distances, as set forth by AASHTO's "A Policy on Geometric Design of Highways and Streets", Latest Edition.
 - f. Maximum grade on a cul-de-sac shall be 6%.
 - g. Grade Breaks shall extend to street crown. If partial grade breaks are used, the design engineer shall demonstrate the need, and how slopes affect curb returns and ADA ramps.

- h. Grades on curb returns shall be consistent with requirements set forth by the Americans with Disabilities Act Accessibility Guidelines (ADAAG), as set forth by the U.S. Architectural & Transportation Barriers Board.
 - i. Streets greater than 6.0% may be approved through the tentative map process.
2. Street grades on the minor legs of intersections shall not exceed 4% for a minimum distance of 50 feet measured from the extension of the face of curb of the primary street through the intersection (improved to full City standards). Additional criteria are as follows:
- a. Street intersections of two local streets in a stop condition do not require a vertical curve at the intersection of the crown section with the street grade.
 - b. Other street intersections shall require a vertical transition at the intersection of the crown section with the street grade.

Note: A local street is defined as having a maximum average daily traffic volume of 1,000 trips or, serving a maximum of 100 single family lots, and conforms to the description in the Master Plan.

3. Street Crown - The normal street crown is 2.0% from the centerline to the lip of gutter, with a minimum of 1.0% and a maximum of 4%. Unless approved otherwise, the crown shall be at the centerline of the traveled way.
4. Vertical curves shall be provided wherever the algebraic difference between two intersecting grades is greater than 1% on roadways 35MPH or greater, or greater than 2% on roadways less than 35MPH, excluding intersections. Such curves shall be of sufficient length to provide the minimum sight and stopping distances as established by the AASHTO's, "A Policy on Geometric Design of Highways and Streets", Latest Edition, for minimum design speeds of 30 MPH for local and collector streets, 40 MPH for minor arterial streets and 50 MPH for major arterial and expressway streets.
5. Minimum horizontal curve radii shall be as specified in the ensuing table:

**Minimum Horizontal Centerline Design
Radii for Streets in City of Reno**

	Minimum Design	With Normal	With 2% Super-	With 4% Super-
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Street Classification	Speed	Crown	elevation	elevation
Local Streets Serving less than 20 lots Serving between 20 & 50 lots Serving more than 50 lots	20 mph 25 mph 30 mph	100 feet 185 feet 300 feet	250 feet	230 feet
Collector Streets	30 mph	430 feet	335 feet	300 feet
Minor Arterial Streets	40 mph	820 feet	630 feet	565 feet
Major Arterial & Expressway Streets	50 mph	1,390 feet	1,045 feet	925 feet

Note: On local and residential collector streets (less than 4000 ADT), lesser radii may be permitted by special alternate designs approved by the City Engineer which include traffic calming, short tangent sections and short radii designed to restrict drivers from exceeding posted speed. In no instance shall such reduced radius be less than 60 feet. Traffic calming alternatives are shown in the "Supplemental Standard Drawing Details". The City Engineer will make the final determination on which alternative will be used in any particular situation.

Minimum Stopping Sight Distance for City Streets

DESIGN SPEED V (mph)	f (friction factor)		Minimum Stopping Sight Distance (feet)
	Low Speed Urban Street Design	High Speed Urban Street Design	
20*	0.30		115
25*	0.25		155
30	0.22	0.16	200
40		0.15	305
50		0.14	425

The minimum design radius shall be determined using the following formula:

$$\text{where, } R_{\min} = \frac{V^2}{15(e+f)}$$

R - Centerline Radius of roadway.

- e - Superelevation rate, decimal (For a normal crown section, e is assumed negative for adverse side). Superelevation may be required by the City Engineer on higher speed streets. Maximum allowable superelevation shall be four (4) percent.
- f - Friction factor from above table.

*Notes: Horizontal curves on local streets: (1) serving 20 lots or less may be designed at 20 mph and posted at 15 mph; and (2) 50 lots or less may be designed at 25 mph and posted at 25 mph, unless otherwise approved by the City Engineer. (Lots shall include existing and future development.)

Curves on any street, except local streets, shall be separated by a tangent of not less than one hundred 100 feet. Unless specifically approved in a tentative map or other public review, no local street in a residential district shall have a tangent of greater than six hundred (600) feet or the distance of twelve (12) lots on one side of the street, whichever is less, unless it can be demonstrated that the tangent is visually broken by a vertical curve or that a longer tangent is necessary to preclude a traffic hazard. A successful street design will result in traffic calming and reduce the need for future installation of traffic calming measures

- 6. Unless specifically approved or conditioned by the Planning Commission of the City Council alternatively, public street, private street, and driveway sections (widths) shall be per the Standard Details. Alternate street sections shown herein may be used when approved by the City Engineer or as conditioned or approved by the Planning Commission or City Council a submission requiring public process. Driveway access from single-family dwellings shall not be permitted on collector streets which are anticipated to carry more than four thousand (4,000) average daily vehicle trips. Reference the Residential Standards Table on page 107 and Roadway Sections Graphics for alternate sections on pages 108-109.

- 7. Street spacing and intersection placement shall be as follows:

Minimum distance between intersections (unless otherwise approved with a tentative map or special use permit).

<u>Classification</u>	<u>Downtown</u>	<u>Outside Downtown</u>
Major arterial	1/3 mile (1,760')	1/2 mile (2,640')
Minor arterial	1/4 mile (1,320')	1/3 mile (1,760')
Commercial collector	600 feet	800 feet

Residential collector	400 feet	400 feet
Local	200 feet	200 feet

8. Median openings on arterial streets that have continuous raised center medians, will not normally be permitted unless all the following conditions exist:
 - a. The property to be served is a major traffic generator and has a minimum continuous frontage of 600 feet along the major street, or access easements are recorded to allow use of the opening by a minimum of two properties which combined generate sufficient traffic to warrant the opening.
 - b. The median opening is not less than 700 feet from an intersection with an arterial street.
 - c. The median opening is not less than 400 feet from an intersection with a collector or local street.
 - d. The median opening is not less than 600 feet from any other existing or planned midblock median opening.
 - e. Sight distance is adequate for the design speed of the major street.
 - f. All costs such as base material, pavements, safety lighting, traffic signals, landscaping, irrigation, reconstruction or utility relocation required by a midblock opening will be borne by the requesting party.
 - g. The design of median openings shall be subject to the requirements and approval of the City Engineer including storage lengths and tapers to AASHTO requirements.

9. All regional roads shall follow access management standards as outlined in the RTC's most recently adopted RTP.

WITHOUT PARKWAY STRIPS

TYPE	FIRE SPRINKLERS	WIDTH (1) (FEET)			CURB REQ'D R=ROLLED V=VERTICAL (5)	MAX CUL-DE-SAC LENGTH (FEET)	BULB DIAMETER (FEET)		MAXIMUM LOTS SERVED	MAXIMUM ADT	BIKE LANE (8)	SIDE-WALK BOTH SIDES (FEET) (10)	ROW WIDTH (FEET)			PUE EACH SIDE (FEET) (3)
		W/O PARKING (A)	WITH PARKING ONE SIDE (B)	WITH PARKING BOTH SIDES (C)			W/O PARKING	WITH PARKING					W/O PARKING (A)	WITH PARKING ONE SIDE (B)	WITH PARKING BOTH SIDES (C)	
Shared Driveway, Alleys and Permanent Emergency Access	Yes	20	26	34	Optional	1000	Hammer-head or 80	100	12	N/A	No	Optional	20	28	36	7.5 or as required
Shared Driveway, Alleys and Permanent Emergency Access	No	20	28	34	Optional	600	Hammer-head or 100	100	8	N/A	No	Optional	22	30	38	7.5 or as required
Local Street	Yes	N/A	26	34	V	1000	80	100	100	1000	No	4	N/A	36	44	7.5
Local Street	No	N/A	28	36	V	600	100	100	100	1000	No	4	N/A	38	46	7.5
Collector Street	N/A	28	32	40	V	N/A	N/A	N/A	N/A	8000 (2)	Optional	4	38	42	50	7.5

WITH PARKWAY STRIPS

TYPE	FIRE SPRINKLERS	WIDTH (1) (FEET)			CURB REQ'D R=ROLLED V=VERTICAL (5)	MAX CUL-DE-SAC LENGTH (FEET)	BULB DIAMETER (FEET)		MAXIMUM LOTS SERVED	MAXIMUM ADT	BIKE LANE (8)	SIDE-WALK BOTH SIDES (FEET) (10)	ROW WIDTH (FEET)			PUE EACH SIDE (FEET) (3)
		W/O PARKING (A)	WITH PARKING ONE SIDE (B)	WITH PARKING BOTH SIDES (C)			W/O PARKING	WITH PARKING					W/O PARKING (A)	WITH PARKING ONE SIDE (B)	WITH PARKING BOTH SIDES (C)	
Local Street	Yes	N/A	26	34	R or V	1000	80	100	100	1000	No	4	N/A	56	64	7.5
Local Street	No	N/A	28	34	R or V	600	100	100	100	1000	No	4	N/A	58	64	7.5
Collector Street	N/A	26	30	38	V	N/A	N/A	N/A	N/A	8000 (2)	Optional	4 or 8 one side	56	60	68	7.5 (4)

- (1) All widths measured from front face of curb to front face of curb (or gutter flow line for rolled curbs, or EOP without curb).
- (2) 4000 maximum ADT with lots having access.
- (3) Utility stubs and services must extend beyond right-of-way, sidewalk, or PUE, whichever is greater.
- (4) If 8' path option is exercised, add 4' on one side and delete 4' from opposite side.
- (5) Lay-down curbs may be permitted in mobile home parks.
- (6) Additional right-of-way or easement may be required for parallel roadway drainage.
- (7) PUE shall be public utility easement/public use easement (sidewalk).
- (8) Bike lanes require additional 5' of pavement and right-of-way per lane in accordance with the Master Plan and/or Bikeways Plan.
- (9) Deviations from above standards for addition of medians or wider planting strips in commercial areas shall require prior approval of the City Engineer.
- (10) ADA requires a passing space at intervals not to exceed 200' or sidewalk must be 5' wide.
- (11) All street widths shall be 20' or greater as required by Fire Code.
- (12) Right of Way requirements may be impacted by LID/SWQM features.

10. Any street, highway, or driveway, intersecting any other street or highway, shall intersect at an angle as near to a right angle as is practicable, but in no event shall an intersection be allowed at an angle of less than 60 degrees unless approved otherwise by the City Engineer.
11. Cul-de-sacs and dead end streets shall conform to Fire Code requirements. Shared driveways may be terminated in a hammerhead. The minimum lot frontage on cul-de-sac streets shall be thirty (30) feet. "No Outlet" signs shall be posted on cul-de-sacs with length greater than 100'.
12. Private streets shall be designed to City standards, including horizontal and vertical alignment. Gated private streets shall provide a means to turn around if gates are closed. All gates shall be "click to enter" per Fire Department standards unless otherwise approved by the City Engineer. Storm drain systems and sanitary sewer systems located within a private street shall be constructed to City standards. Maintenance of the gates shall be by the private development. Signs shall be posted stating "Private Street, Not Maintained by City".
13. Shared driveways shall be structurally designed and paved with a minimum of 2 inches of asphalt concrete pavement placed over an engineered base of not less than 6" of Type II, Class B aggregate base or with a pervious pavement system defined in the Truckee Meadows Structural Controls Manual with the approval of the City Engineer.
14. Design of the structural section for Asphalt Concrete Pavement for both public and private streets shall conform to the procedures as set forth in the current Asphalt Institute Manual Series No. 1 (MS-1), based on subgrade strength values determined by Resilient Modulus (MR) Value, Resistance (R) value or California Bearing Ratio (CBR). Subgrade shall be corrected to a minimum R-value of 30. Sufficient tests shall be made to evaluate fully each different soil type in the project. Asphalt Concrete Pavement (ACP) mix shall be Type II with hydrated lime (mineral filler) added at one and one-half percent of the weight of the dry aggregates, except Type III asphalt concrete pavements shall be used for the top lift on all local streets unless otherwise approved. Asphalt cement grade PG64-22 shall be used for the top 2 inches minimum of all finished pavements. The minimum design life of the structural section shall be 20 years. Minimum street structural sections for both public and private streets

shall be 4" ACP on 6" of aggregate base for local streets, 5" ACP on 8" aggregate base for collector streets, and 6" ACP on 12" aggregate base for arterial streets. All streets, both public and private, which are to be utilized by construction vehicles during development shall be designed to carry the maximum anticipated loads and temporary road surfaces that are open to traffic are required to be paved for project duration. Concrete streets may be permitted upon approval of structural designs by the City Engineer.

15. Asphalt test core holes shall be plugged with 4,000 PSI concrete per the Standard Specifications.
16. Cul-de-sacs and Knuckles - Minimum grades around Cul-de-sac bulbs and within Knuckle-type intersections shall be 0.5%. The street crown within cul-de-sac bulbs and knuckle type intersections may be increased to a maximum of 4.0% from the centerline to the lip of gutter. Knuckle turnouts are not allowed on streets serving more than 20 lots, without prior approval by the City Engineer. Cul-de-sac lengths shall be measured from the front face of curb (or edge of pavement where no curb is present) of the intersecting street to the radius point of the bulb turnaround, unless provided with an emergency access to City standards. The minimum right-of-way for the bulb shall be 6" beyond the curb if no sidewalk is required or 6" behind the sidewalk if sidewalk is required.
17. Temporary cul-de-sac bulbs shall be constructed with a minimum of 2 inches asphalt concrete pavement on an engineered base with asphalt curbing when located within the development. When located within an adjacent future developable area it shall conform to temporary emergency access road standards within an access easement. All temporary cul-de-sac bulbs shall have a minimum 50 foot radius. Final approval for temporary cul-de-sacs will be the responsibility of the Reno Fire Department.
18. Emergency Access Roads - Roadways are to be a minimum width of 24 feet structurally designed to support a tandem axle loading of 30 tons, with a minimum centerline turning radius of 40 feet, unless otherwise approved by the Fire Marshal. Grades shall not exceed the maximum for street grades unless otherwise approved by the Fire Chief and the City Engineer. It is intended that emergency access roads be open and usable at all times. Where required, access to the roadway at each entrance shall be controlled by an "Emergency Access Control Gate", shall be posted "For Emergency Vehicles Only", and shall incorporate strobe actuated gate opening devices. Maintenance of the gates shall be by the private development. Installation and maintenance of the gates shall be by the private development.

- a. Temporary emergency access roads shall be surfaced with a minimum of 2 inches of Type 2, Class B Aggregate Base applied with a minimum of 0.08 gallon per square yard of a non-latex emulsion asphalt seal coat, such as SS-1 or SS-1h, and be provided with adequate roadside drainage.
- b. Permanent emergency access roads shall be paved with a minimum of 2 inches of asphalt concrete pavement on an engineered base and are to be provided with adequate roadside drainage.

Unless otherwise approved by the City Engineer, all improved emergency access roads shall provide for vehicles to enter traffic nose-first.

- 19. Improved Maintenance Access - Vehicular access roads for maintenance of City owned sanitary sewer and storm drain facilities and their related appurtenances are to be constructed to a minimum unencroached width of 12 feet clear of all lateral obstructions, structurally designed to support a tandem axle loading of 25 tons, with adequate roadside drainage, and are not to exceed 12% in grade. Dead-end access roads in excess of 150 feet shall require termination in a hammerhead, turnaround or 'Y' -turn.
 - a. Temporary maintenance access roads shall be surfaced with a minimum of 2 inches of Type 2, Class "B" aggregate base applied with a minimum of 0.08 gallon per square yard of a non-latex emulsion asphalt seal coat, such as SS-1 or SS-1h, and be provided with adequate roadside drainage.
 - b. Permanent maintenance access roads shall be paved with a minimum of 2 inches of asphalt concrete pavement on an engineered base and be provided with adequate roadside drainage. The driveway entrances for the permanent maintenance access roads shall be commercial rated per City of Reno Standard Detail Nos. R-114A and R-114B, with removable bollards per City of Reno Standard Detail No. R-503. Where sewer or storm drain manholes are located behind the sidewalk, a commercial rated driveway entrance shall be provided with appropriate access to include, as a minimum, a surrounding 4' asphalt concrete pad located outside the concrete manhole collar, terrain permitting. Unless otherwise approved by the City Engineer, all improved maintenance accesses shall provide for vehicles to enter traffic nose first.

- c. Under special hillside terrain conditions, alternate access roads per City of Reno Standard Detail No. R-227 may be used, with approval of the City Engineer.
20. Temporary Patches - Temporary patches on public streets are to be a minimum of 2" thick and compacted, and shall not deviate more than 3/4 inch above the existing pavement grade when measured from the bottom of a straight edge laid two feet beyond the patch on both sides of the existing pavement. In no case shall the elevation of the patch be lower than the existing adjacent pavement elevation. All loose material shall be removed from the temporary patch in conformance with the requirements of this paragraph immediately after completion of the patch. It will be the responsibility of the excavation contractor to maintain the temporary patch until the permanent patch is made. All patches on collector or larger streets shall be hot mix asphalt.
 21. Retaining Walls - Unless using standard City details, all retaining walls constructed within the public right-of-way must have an easement granted of sufficient width on the private property to maintain the wall. All retaining walls which are to be maintained by the City shall have a complete set of design calculations submitted with the improvement plans for review. All calculations shall be signed and sealed by a Nevada Licensed Civil or Structural Engineer. Any retaining walls constructed on private property shall be reviewed by the Building Department and shall be subject to current design criteria. An anti-graffiti treatment shall be incorporated on all masonry or concrete retaining walls. Retaining walls shall be located within the property it supports with adequate space and access at the low end to permit reconstruction.
 22. "Rock Pockets" in the final surface of the asphalt shall be filled with Type II Slurry Seal, if applicable, or by patching or reconstruction as designated by the City Engineer.
 23. Additional standards that may apply include, but are not limited to, Redevelopment Streetscape standards, Regional Center Plans, Transit Oriented Development Corridor Plans, SUP, SPD, Planning Overlay, Neighborhood plans, etc. per Section 18.06 of the Reno Municipal Code.
 24. Where applicable, the use of raised landscape medians to channelize and control left turn movements from a street are preferred over the use of pavement markings and signs only to delineate left turn storage facilities.

25. Alternative paving surfaces such as stamped concrete may be considered instead of the treatment shown on the approved street section detail. Alternate paving surfaces shall be approved by the City Engineer and will require that a “hold harmless” agreement (see Appendix A11) be completed between the City and the property owner.
26. Parkways are required on certain new streets. The specific streets to receive parkway treatments are contained in Section 18.06 of the Reno Municipal Code. See also Regional Center Plans and Transit Oriented Corridor Plans per Section 18.06 of the Reno Municipal Code. Sidewalk widths and right-of-way may be impacted also.
27. Maintenance of parkways will be the responsibility of the adjacent property owner, homeowners association or landscape maintenance district.
28. Site grading shall be minimized so as to maximize undisturbed areas. Where expanded grading is necessary and as approved by the City Engineer, it shall include erosion control Best Management Practices in conformance with the most current version of the Truckee Meadows Construction Site BMP Handbook.
29. Fill material containing over 30 percent (by weight) of rock larger than $\frac{3}{4}$ inches is defined as rock fill. Rock fill located three or more feet below finished grade may be constructed in loose lifts up to the maximum size of the rock in the material, but not exceeding 18 inches in thickness. Material shall be placed to avoid keying or nesting. The voids around the rock in each rock lift shall be filled with granular material and fines and compacted to the satisfaction of the City Engineer. Rock larger than 18 inches shall not be allowed in the rock fill without the approval of the City Engineer. Rock larger than 4 inches shall not be placed in the upper 1 foot of structural fill.
30. To assure proper future pavement mating, paper joints are to be used at the ends of any new public pavement project (saw cutting shall not be allowed). In addition, the terminus of adjoining asphalt pavement pull lines are to be staggered a minimum of three feet (3.0'). Longitudinal joints shall be offset a minimum of 6" from the joint in underlying lifts.
31. Where paving or overlays involve intersections of secondary and primary streets, the intersection paving joint shall be located in the secondary street, a minimum of four feet off the gutter line of the primary street, and neat lined for the subsequent paving of the adjoining street. Asphalt concrete pavement joints/seams will not be

allowed in any drainage flow lines. Any alternative paving configurations must be approved by the City Engineer.

32. Per the Standard Specifications, subgrade compaction shall be accomplished per the test procedures set forth in ASTM D1557. Time-rated consolidation analyses or tests will not be accepted for compaction of subgrades on public improvement projects.
33. For adjoining asphalt concrete pavement top lifts, the contractor shall assure a tight, smooth and unraveled joint. For pavement edge joints, such as along gutter lines, the joint must be contoured to avoid future raveling. Pavement joints shall be placed such that they are not be in the wheel paths.
34. Recycled asphalt base material may be utilized as a substitute for Type 2, Class B, aggregate base for use under bituminous pavement if it meets the following criteria:
 - a. Recycled asphalt base material shall conform to the Standard Specifications, Subsection 200.01.04, Type I Recycled Asphalt Concrete Base.
 - b. The Engineer of Record shall provide documentation to confirm that adequate testing was performed to ensure compliance with the Standard Specifications.
 - c. Recycled asphalt base shall not be substituted for Type 2, Class B, aggregate base under any Portland Cement Concrete structure.
 - d. Density testing must be per ASTM Standards. No direct-read nuclear gauge tests will be allowed without proper correlation. Nuclear gauge tests reporting moistures will be rejected.
 - e. For street reconstruction, AC grindings may be combined, in place, with base course and subgrade, per gradation requirements as set forth in Orange Book sec. 200.01.04. Sufficient test results shall be provided prior to approval for use.
35. Slurry seal of streets shall be required on all new acceptances.

SECTION 3. - Sidewalks, Curb and Gutters, Driveway Aprons, Curb-Cuts, Alleys and Bikeways:

1. Public sidewalks, curbs and gutters shall be installed with all new developments, except as noted below in this paragraph. Existing improvements shall be replaced when those improvements are deteriorated or displaced, including paving between the street cut and gutter line on all streets. Sidewalks may only be omitted where the sidewalk has been waived in accordance with RMC 18.12.801. In no instance, shall sidewalks be less than 4 feet in width. In commercial areas sidewalks shall not be less than 6 feet in width. All sidewalk widths specified in this paragraph are to be free of all lateral obstructions and street furniture that would hamper pedestrian flow. Pedestrian ways shall be provided from all public sidewalks to the entrance of buildings as required by the City Engineer. Necessary rights-of-way shall be dedicated or easements granted for the pedestrian ways as required by the City Engineer. In new developments, sidewalk requirements shall be determined at time of tentative map or parcel map approval, typically on both sides of all streets, public and private, unless another means of pedestrian access is approved, or if sidewalk is impractical or is unnecessary for pedestrian access purposes as determined by the City Engineer. At the discretion of the City Engineer, sidewalks in commercial or industrial developments may be deferred until a building permit is issued.
2. Unused driveway aprons that do not provide access onto private property, or portions thereof, shall be replaced with new curb, gutter and sidewalk. The driveways shall be designed as nearly perpendicular as possible to the adjoining street or cul-de-sac.
3. Curb returns shall be constructed with "Pedestrian Ramps for the Disabled" in accordance with City standards. A minimum of one mid-block ramp shall be provided at "T"-intersections. Alignment of ramps and crosswalks shall provide for minimum pedestrian exposure to traffic during crossing of streets.
4. Curbs, gutters and curb cuts to allow for storm water runoff to enter treatment areas are to be constructed of Portland Cement Concrete, per City standards. Glue-down curbs are not permitted for new construction.
5. At each right angle street intersection, the property line at each corner shall be rounded with a curve having a radius of not less than 15 feet on local streets, 20 feet on collector streets, 23 feet on minor arterial streets and 33 feet on major arterial and expressway streets. The major street shall dictate radii. The City Engineer may require a different radii when streets intersect at an angle other than 90 degrees, or to accommodate existing and future utility and public

- improvements, to include drainage facilities and traffic control devices.
6. Unless specifically approved otherwise, curb returns shall have minimum face of curb radii of 20 feet on local streets, 25 feet on collector streets, 30 feet on minor arterial streets and 40 feet on major arterial and expressway streets.
 7. Driveway spacing and location shall conform to City Standard Details for driveway geometrics.
 8. The design of bikeways shall conform to the AASHTO "Guide for Development of New Bicycle Facilities", latest edition, unless otherwise specified by City ordinance, Standard Specifications and Details for Public Works Construction, or items in this section. Where bike lanes are required, street sections may vary.
 9. Bicycle and Pedestrian Paths - The structural section for these facilities shall be based on a soils report recommendation. The minimum structural section shall be 2 inches of Type II or Type III asphalt concrete pavement over 6 inches of Type II Class B aggregate base, except that where they are integrated with adjoining pavement for vehicular access, the associated minimum street structural section shall apply.
 10. No obstruction (i.e., power poles, street lights, signal poles and controls, water meter boxes, pull boxes, mail boxes, etc.) shall be allowed to be located within public sidewalks or pedestrian ways, or within sight triangle, except as may be allowed by the City Engineer. A minimum unobstructed clearance of 36" shall be maintained from any obstacle. Additional right-of-way or easement shall be provided where required.
 11. Cut and fill slopes are to be set back a minimum of 1 foot from the back of the sidewalk. If no sidewalk exists the setback shall be a minimum of 5 feet from back of curb.
 12. Where car storage or access for motor vehicles is a standard curb cut, drive approach and driveway must be constructed.
 13. At existing or future RTC RIDE bus stops, rights-of-way shall be dedicated and concrete bench/shelter pads constructed, as required by the City Engineer and Regional Transportation Commission. Bus turnouts are to be provided when required by the City Engineer. The distance from the flowline to front face of curb shall be 12 feet. Bus turnouts shall be reviewed by the Regional Transportation Commission.

14. Any construction work beneath existing concrete structures (i.e., sidewalks, curbs, gutters, aprons, walls, etc.) that are within the public right-of-way shall require the removal and replacement of the affected concrete structure. Construction operations (i.e., tunneling, directional drilling, boring, etc.) shall not be allowed under any of the above stated concrete structures, unless specifically authorized in writing by the City Engineer.
15. Patching will not be allowed to repair concrete structures such as curbs, sidewalks, gutters, ramps, driveway aprons, etc., except for the sealing of gaps in older sections. On older sidewalks where gaps exist between the sidewalk and the curb, these gaps may be filled with white cap or backer rod and caulk, if approved by the City Engineer. The white cap/backer is a closed backer rod and the caulk shall be Lithoseal Trafficalk-3G (L.M. Scofield Company), or Silaflex 2C SL (D.M. Figley Company), or an approved equal.

SECTION 4. - Traffic Devices, Construction Traffic Control, and Traffic Calming:

1. The application, design, and installation of traffic control devices shall be in accordance with the Manual on Uniform Traffic Control Devices (MUTCD), latest edition, published by the Federal Highway Administration.
2. Traffic control devices shall be installed, modified, or removed, as appropriate, on all public and private streets, alleys, and bikeways either newly constructed or improved with development.
3. Street name signs to City standards shall be installed at all intersections, and may be required on arterial streets in advance of intersections. Where private streets intersect public streets, standard signs which say "Private Street Not Maintained by City" shall be installed.
4. Speed limit signs shall be installed in proximity to all arterial or collector street intersections, and on local streets having a different speed limit than the intersecting street. Posted speeds on City streets shall be 25 MPH on local and collector streets, 35 MPH on minor arterial streets and 45 MPH on major arterial streets, unless designated otherwise by the City Engineer consistent with City policies or law. Speed limit signage shall be installed on all streets where the limit changes from one speed to another.
5. When the design speed of a curve falls below the posted speed limit, curve warning signage with an advisory speed plate and 4 inch

- double solid yellow centerline striping shall be installed from beginning of curve to end of curve.
6. A "No Outlet" sign shall be installed at the entrance to any cul-de-sac exceeding 100 feet in length.
 7. At driveways on minor street intersections with one-way or median-divided streets, "One Way" and/or "Right (Left) Turn Only" signs shall be installed. Corresponding pavement markings may also be required.
 8. Parking control signs shall be installed and curbs painted at street intersections, at fire hydrants, adjacent to driveways, and other locations as required. Curb colors are red for parking prohibited, yellow for restricted parking. The top and face of the curb shall be painted with standard traffic paint. Parking is prohibited within 15 feet centered on the fire hydrant; Reno Fire Department policy establishes locations for required hydrant markers.
 9. Within the parking meter district, the removal, relocation, or installation of parking meter poles and parking space marking may be required. The removal or installation of parking meters shall only be performed by the City. Meter bags may be obtained from the Community Development Department.
 10. When half street improvements are constructed abutting existing pavement, the entire width of the street and adjacent transition areas shall be striped in accordance with applicable MUTCD and City standards. Existing, conflicting pavement markings shall be removed.
 11. All longitudinal pavement striping shall consist of traffic-rated paint as specified in Section 214 of the Standard Specifications for Public Works Construction or an approved equivalent. Transverse striping, letters and symbols shall be installed with preformed thermoplastic material with a minimum thickness of 0.125 inch. All striping materials are to be installed per the manufacturer=s instructions (refer to Section 5 - Traffic Policies, Materials and Equipment Standards). On existing streets where the pavement surface is not in good condition, painted pavement markings may be approved by the City Engineer.
 12. Where there is stop or yield control on a residential street, a 12 inch white stop bar with 50 feet of solid 4" yellow centerline striping shall be installed. On minor or major arterial streets, a 24 inch white stop bar shall be installed.

13. School related traffic devices shall be installed, relocated, or removed as required, and as consistent with the applicable "safe route to school plan". New or updated "safe route to school plans" shall be required in conjunction with the development of new schools or expansion of existing schools. Traffic Engineering shall review, approve and maintain all new or updated "safe route to school plans". Following approval in writing of such plans by the Washoe County School District, all new or updated plans must be submitted to Traffic Engineering for review and approval. The "Nevada School Traffic Safety Handbook" establishes guidelines for the application of school-related traffic devices.
14. Warning signs and/or retroreflective end of roadway markers shall be installed at the end of streets (except fully improved residential cul-de-sacs). For street ends where there is a significant elevation change adjacent or there is a need to control access, barrier rail, guardrail, bollards, or barricades may also be required.
15. When triangular islands are constructed at street or driveway intersections, the curb shall be painted white and reflective markers installed at the corners. The ends of center medians shall be painted yellow; and reflective markers installed at the ends and along the median.
16. When new construction affects elements of an existing traffic signal, relocation and/or replacement is required. After proposed traffic signal loop detector locations have been marked, City of Reno Traffic Signal Maintenance staff will verify locations prior to construction. Damaged loop detectors shall be repaired within two working days, unless impractical due to other scheduled work. Exceptions to the two working day requirement shall be approved by the City Engineer. Loops that have not been repaired within the time specified, the City shall back charge the contractor the cost of repairs.
17. For the installation of new traffic signals or modification of existing signals, refer to Chapter I - Section 5 for equipment standards, Chapter V for improvement plan requirements, and Chapter VI for inspection, testing, and turn-on procedures. Also refer to the Traffic Signal Pole, Traffic Signal Pole Street Name Sign and General Traffic Signal Notes (Drawings R-413A through R-413E) in the Standard Details.
18. For work within public streets, the issuance of excavation and/or encroachment permits with approval of construction staging/traffic control plans is required. Necessary temporary construction traffic control devices shall be properly maintained at all times, until the

permanent construction is completed and traffic devices installed. When possible, construction heavy equipment shall be required to use specific truck routes as addressed in Section 6.14.160 of the Reno Municipal Code. The Engineer of Record shall provide a map identifying the construction equipment route from the site to the nearest collector or arterial street that will have the least impact on surrounding residents. Streets or portions thereof used for construction staging or primary access shall be repaired or reconstructed as directed by the City Engineer. Haul routes may be required when 50 cy or more are being transported.

19. Where temporary access or turnarounds are proposed, security will be required and maintained until permanent improvements are installed.
- 20.. Traffic reports shall conform to the Regional Transportation Commission "Traffic Report Guidelines - Regional Road Impact Fee", latest edition. If a traffic report is required, the final striping plan must be reviewed by the licensed professional who prepared the report.
21. Copies of technical analyses associated with street design and traffic device improvements may be required by the City Engineer.
22. Prior to the dedication of any public rights-of-way, adequate sight distance shall be demonstrated at all intersections. The design of all new commercial driveways shall provide for adequate sight distance. All above ground utility features (such as transformer boxes) shall be located or relocated so as to not adversely affect sight distance in proximity to street intersections and driveways.
23. Traffic signs and/or pavement markings shall be installed on all street segments within or adjacent to a development to designate bicycle routes or bicycle lanes identified in the City of Reno Bikeways Plan.
24. The design and placement of speed humps or other traffic calming improvements on new or existing streets shall conform to applicable City policies and standards.
25. All existing or temporary pavement markings or striping shall be removed by wet sandblasting or grinding. Excess damage during removal may require slurry seal or chip seal at the discretion of the City Engineer. Remove existing markings so that at least 95% of the underlying pavement is visible. Blacking out, or otherwise covering existing markings shall not be permitted.

26. School zones shall have a 15 MPH speed limit during the times set forth on signs erected at the beginning of the school zone or as indicated by alternating yellow flashing beacons. School crossing zones, as defined as areas not directly adjacent to the school, shall have a 25 MPH limit or less as designated by signage erected at the beginning of the school crossing zone. The times of the speed limit for the school crossing zone shall be set forth on the sign or indicated by alternating yellow flashing beacons.
27. All signs, sign posts and other public property that are removed from the public right-of-way, not to be reused on the project, are to be dispositioned by the City Engineer for either salvage to the City of Reno's Corporation Yard or disposal by the contractor.
28. The Nevada Department of Transportation (NDOT) specification for Type X – Fluorescent Orange Sign Sheeting shall be required on all Public Works construction projects within the City's right-of-way. This sheeting requirement only affects construction signs and not the sheeting required for cones, drums and barricades.
29. New crosswalks shall consist of solid white longitudinal lines, parallel to the flow of traffic, 24" wide x 10' long, and spaced 24" apart

SECTION 5. - Traffic Policies, Materials and Equipment Standards:

Traffic policies, materials and equipment standards included in Appendix B, supplement, extend, and modify applicable provisions of the MUTCD and Standard Specifications for Public Works Construction. It is the responsibility of the user of this manual to obtain the up-to-date versions of the policies listed in Appendix B from the Traffic Engineering Division.

SECTION 6 – ALLEYS –

1. Alleys required to serve a development or project shall be constructed as part of the project. Existing improved alleys serving a project shall be reconstructed or repaired as part of the project if deteriorated, as defined herein. No alley repair or reconstruction work shall be required for an addition consisting of 500 square feet or less to an existing structure or a tenant improvement or interior remodel consisting of 1,000 square feet or less. Improvements not adjacent to the project parcel may be required if needed to provide safe and adequate access to the property.
2. Longitudinal grades of the alley shall conform to standards for streets, with a cross slope of 2.0% minimum from the property line toward the center of the alley.

3. All alleys shall be 4 inches of Portland Cement Concrete on 6 inches of Type II, Class B aggregate base with subgrade corrected to a minimum R-value of 30 unless otherwise approved by the City Engineer. If approved, the minimum asphalt structural section shall be 6 inches of asphalt concrete pavement on 6 inches of Type II, Class B aggregate base with subgrade corrected to a minimum R-value of 30.
4. Alleys shall be constructed or reconstructed to full width and from the lip of asphalt on each adjacent street.
5. The proportion of alley contribution required by an individual project will be determined by the percentage of traffic to the alley that is attributable to that parcel of land compared to all parcels adjacent to that alley on that block. Traffic contribution will be assumed for any parcel that can access their property from the alley, regardless of whether the project increases, decreases or does not change alley access. The traffic proportion based on average daily weekday trip rate is to be determined by the Institute of Transportation Engineers (ITE), Trip Generation, most recent addition.
6. For purposes of determining proportional cost contribution for an individual project, the value of reconstructing the entire alley with PCC will be determined by measuring the length of the entire alley including the alley approach from lip of asphalt to the opposite end of the alley and multiplying that number by the width and multiplying that by the cost per square foot from Exhibit A of the Public Works Design Manual.

Sample calculation:

Length of the entire alley = 300 feet

Width of alley = 20 feet

Alley cost from Exhibit A = \$18 per square foot (for illustration purposed only – check current manual for prices)

Length x width x cost = 300 x 20 x \$18 = \$108,000 total value of alley

Proportional contribution for the project as determined by ITE study = 17%

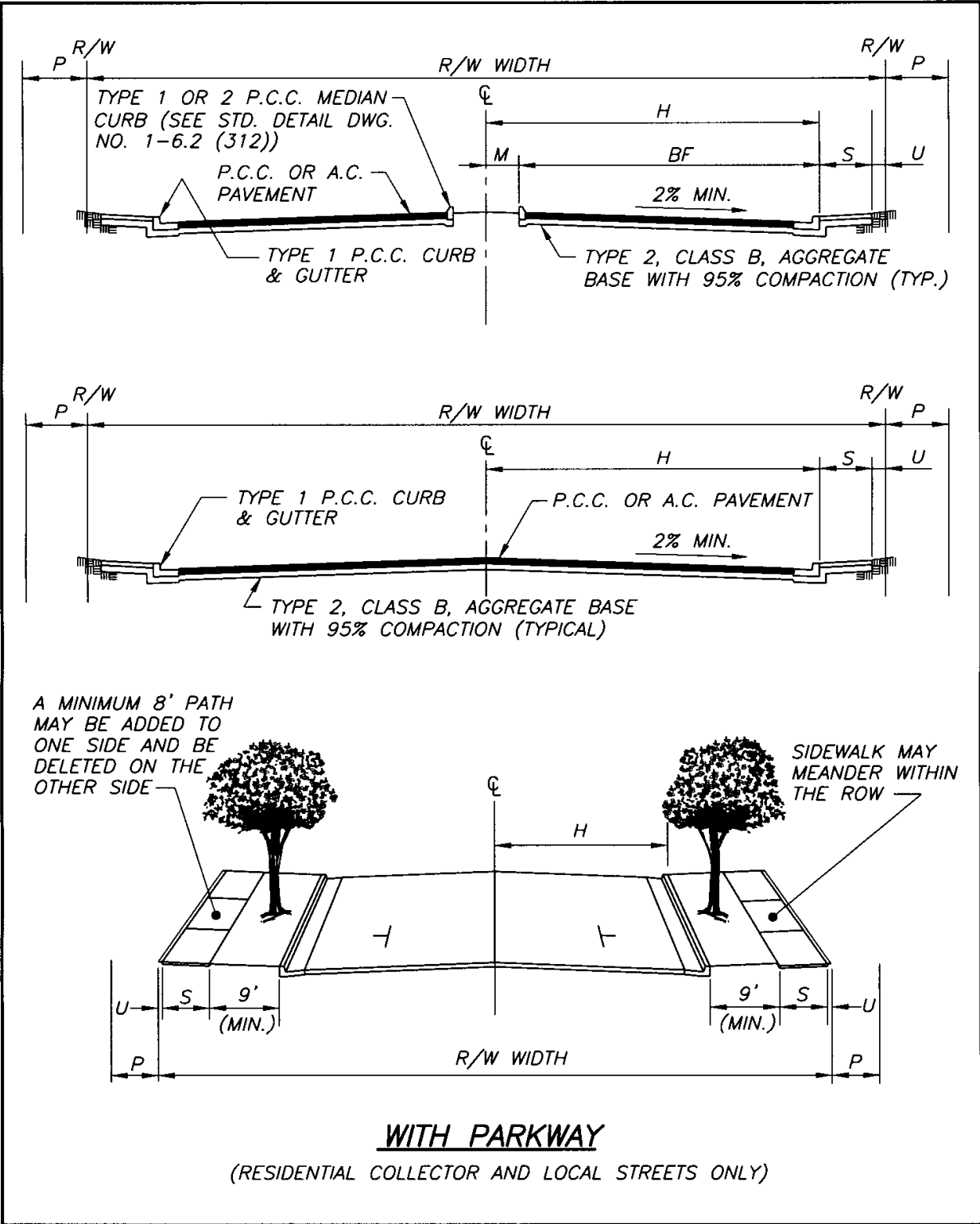
\$108,000 x 17 % = \$18, 360 maximum required alley contribution for the project

7. The alley contribution required for a project may be used for repair or reconstruction as determined by the Alley Distress Table. Staff will evaluate alleys on a case by case basis to determine the best use for the alley contribution. Portions of the contribution may be used on sections of the alley not adjacent to the project parcel.

- 8 P.C.C. Alley deterioration shall be determined in conformance with the PAVER Concrete Distress Manual published by the US Army Corps of Engineers, TR97/105, June 1997, or current edition. Individual distresses shall be mitigated in conformance with the P.C.C. Alley Distress Table. Alleys comprised of alternative materials will be evaluated by other methods, on a case by case basis.

P.C.C. Alley Distress Table

Distress No.	Distress	Severity	Remediation
22	Corner Break	Low-Medium	Seal Cracks
		High	Sawcut , remove and replace affected area
23	Divided Slab	Low-Medium	Seal Cracks
		High	Sawcut, remove and replace slab
24	Durability Cracking	Low - High	Epoxy patch / fill
28	Linear Cracking	Low to High	Fill cracks
	Faulting	>3/4 inch	Grind Transition
29/30	Patching Large/Small	Condition worse than that of alley	Sawcut , Remove and Replace affected area
32/36	Popout /Scaling	Medium < 50% or < 1/4" to 1/2" depth	Epoxy Sand Seal
		High>50% of slab	Sawcut , Remove and Replace affected area
34	Punchout	Low	Seal Cracks
		Medium to High	Sawcut , Remove and Replace affected area
38/39	Joint /Corner Spalling	Low-Medium	Epoxy Patch
		High	Sawcut , Remove and Replace affected area
W	Standing Water	> 1/4 inch in depth	Sawcut , Remove and Replace affected area, grade to drain



NO.	REVISION	DATE	STANDARD DETAILS FOR PUBLIC WORKS CONSTRUCTION	SECTION
			ROADWAY SECTIONS	DRAWING NO. R-101A (314,320)
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TYPE	R/W WIDTH	P	H	BF	M	S	U	A.D.T. (MAX.)
ARTERIAL-MAJOR	102 \triangle	7.5	44.5	37	7.5	6	0.5	----
ARTERIAL-MINOR	82 \triangle	7.5	34.5	--	--	6	0.5	30,000
COLLECTOR-COMMERCIAL	64	7.5	25.5	--	--	6	0.5	15,000
COLLECTOR-RESIDENTIAL (WITHOUT PARKWAY)	50	7.5	20.5	--	--	4	0.5	8,000 \triangle
COLLECTOR-RESIDENTIAL (WITH PARKWAY)	68	7.5	19.5	--	--	4	0.5	8,000 \triangle
LOCAL (WITHOUT PARKWAY)	46	7.5	17.5	--	--	4	0.5	1,000
LOCAL (WITH PARKWAY)	64	7.5	17.5	--	--	4	0.5	1,000

NOTES:

1. BF AND H ARE MEASURED TO THE BACK FACE OF CURB.
2. CURB & GUTTER SECTIONS SHALL BE POURED SEPARATELY FROM SIDEWALK SECTIONS.
3. STRUCTURAL SECTION TO BE DETERMINED BY ENGINEERING DESIGN BASED ON RESILIENT MODULUS TESTING, BUT IN NO CASE SHALL THE A.C. BE LESS THAN 4" OVER 6" BASE.
- \triangle ADDITIONAL R/W MAY BE REQUIRED ON ARTERIAL STREETS AND AT INTERSECTIONS.
5. WIDER SIDEWALKS ARE TO BE PROVIDED WHEN REQUIRED BY THE CITY ENGINEER.
- \triangle RESIDENTIAL DRIVEWAY ACCESS SHALL NOT BE ALLOWED ON RESIDENTIAL COLLECTORS WHERE THE A.D.T. IS GREATER THAN 4,000.
7. REFER TO ADDITIONAL INFORMATION ON WIDTHS AND REQUIREMENTS FOR RESIDENTIAL COLLECTORS, LOCAL STREETS, ALLEYS, PERMANENT EMERGENCY ACCESS AND SHARED DRIVEWAYS AS CONTAINED IN THE CITY OF RENO'S DESIGN MANUAL.

NO.	REVISION	DATE	STANDARD DETAILS FOR PUBLIC WORKS CONSTRUCTION	SECTION	RENO	
			ROADWAY SECTIONS	DRAWING NO.	R-101B (314,320)	
				DATE	08/00	PAGE
						2
APPROVED BY : S.V.			08/00			