7.4 Street and Storm Drain Plan and Profile Checklist and General Notes

STREET AND STORM DRAIN IMPROVEMENTS

Project: _____ Checked By: _____ Date: _____

Prepared By: _____ Date: _____

This checklist should be considered as a guideline with acceptable minimums to be used for plan preparation by private engineers. Other methods of achieving the desired result can be used.

PLAN CHECKLIST

☐ 1. Plan Check Base Fee required when plans submitted. Totaled bond estimate and complete hydrology study required with first check. Quantity estimate required on plans. Plan size shall be 24" x 36" with standard City title block.

☐ 2. Plans to be approved by engineer. His signature, name, address, phone number and registration number and seal to appear. Does the engineer have a current City business license? City case or project number required in title block. For building permits show address of lot.

☐ 3. North arrow and vicinity map. North arrow to face up or to the right.

☐ 4. Approved names of streets checked against the final map. Street name sign schedule and construction note.

☐ 5. Install stop signs, stop bars, and stop legends if required, in accordance with City policy.

☐ 6. Show proposed traffic mitigation as identified in the project traffic report.

☐ 7. Show horizontal scale and bench mark, including a 3" long (minimum) graphic (bar) scale.

☐ 8. Bearings of all streets shown. Radial bearings on centerline of all catch basins, etc., in a curve. All street intersections shall be at right angles, plus or minus five (5) degrees, unless otherwise approved by the City Engineer.

☐ 9. Stationing to conform with established stationing on approved City plans. Stationing to be left to right. No negative stationing. If you have any questions or problems on stationing, contact City Engineer's Office prior to design.

☐ 10. Check stationing and elevations on consecutive sheets. If more than one sheet, show match lines at identical points on consecutive sheets. Give references to other sheets.

☐ 11. Stationing of all BCR's and ECR's, M.C. of all curves.

☐ 12. Stations at beginning and end of improvements and at center of catch basins, etc.

☐ 13. Centerline curve data, also short and long side for curbed sections.

☐ 14. The offset for adjacent street intersections shall not be less than 200 feet apart, and may be up to 5 feet apart with the approval of the City Engineer.

☐ 15. A minimum 300-foot centerline radius on local streets is required unless prior approval is obtained from the City Engineer. The centerline radius for collector, secondary and major streets above shall be determined utilizing the Caltrans Highway Design Manual. A minimum tangent length of 100 feet is required between compound and reverse curves unless prior approval is obtained from the City Engineer..

☐ 16. 35-foot curb return radii at street intersections with secondary or major streets. All other 25 feet. Wheelchair ramps required at all curb returns except in knuckles. Ramps shall be constructed in accordance with Title 24 and ADA requirements.

☐ 17. Curb return data (delta, tangent, radius and length).

☐ 18. Show right-of-way and improvement widths (parcel to be improved, adjoining parcels and parcels across the street). Corner cut-off required at intersections.

☐ 19. Show lot lines and lot numbers same as record map.

☐ 20. Show existing improvements and dimensions with dashed lines, along with plan references. Show existing adjacent driveway and topo in and adjacent to area of proposed construction.

☐ 21. Show existing pipelines, irrigation lines, structures, power poles, trees, etc., in right-of-way, and include note as to their disposition if encroaching. Label with size, etc., and distance from centerline. Show existing underground structures that may conflict with, or enter into, the design of proposed improvements. Private engineer to have owner controlling utility sign plans after second check if utility is affected in any way.

☐ 22. Show improvements to be constructed with solid lines. Note connections to existing improvements.

☐ 23. Show details, dimensions, etc., of all improvements if not city standards. For all standard improvements show standard drawing number. Check standard drawings for those dimensions to be shown on plans.

☐ 24. Use 6-inch curb and gutter on local and collector streets. Use 8-inch curb and gutter on major, primary and arterial streets. If both 6-inch and 8-inch curb and gutter are being used, show limits on plan for each type of transition. Use 6-inch curb only for medians.

☐ 25. Check general and construction notes against "sample general notes". Show construction notes wherever necessary to clarify construction details.

☐ 26. Length and location of transitions or super elevations, if used; also, of transitional paved sections for drainage.

☐ 27. Show saw cut lines, limits of new paving, old paving, cold planing, overlay, and removal. Use appropriate shading to delineate areas. For new paving, an R-Value test to determine the paving section is required. Where match up paving is required specify a

minimum 0.1' thick , 2' wide cold plane and inlay adjacent to newly saw cut edge of paving per City Standard Pavement Join Details.

☐ 28. Curb-type sidewalk standard. If property line sidewalk is existing within block, continue property line sidewalk to street intersection and transition through return to curb-type sidewalk. Minimum 4-foot clearance required around any obstacle (tree wells, power poles, fire hydrants, etc.).

☐ 29. Show detail of cross gutter if not standard. Cross gutter and aprons to show direction of flow with arrows. Show flow line elevations along flow line of cross gutter.

☐ 30. Show T.C. and flow line elevations on all BCR's and ECR's.

☐ 31. If cross gutter has upstream drainage area greater than 1,000 feet in length, then 10-foot cross gutter required. Otherwise, 6-foot width. Show width on plans.

☐ 32. No mid-block cross gutters. Cross gutters across major streets need prior approval from City Engineer.

☐ 33. Typical sections for all streets. Show existing, proposed and ultimate conditions. Show right and left sides of sections as they would appear looking upstation on the street even if only one side of the street is being improved. Identify property lines. Give level line offsets from centerline to quarter crown and T.C. New streets shall have a cross slope of 2 percent. Show range of slopes on existing and match-up paving. If difference in elevation between top of curb and existing ground at property line exceeds one foot, indicate what slopes are to be constructed outside the right-of-way, 2:1 maximum. Maximum 2:1 slope within street right-of-way.

☐ 34. Submit design cross sections at 50’ intervals where match up paving is proposed. Sections shall be at a scale of not less than 1"= 20' horizontal and 1" = 2' vertical and labeled clearly with existing and proposed cross slopes, elevations, and dimensions. Cross slopes to be in the range of 1% to 2% for driving lanes and 2% to 4% for shoulders. 2% driving lane and 6% shoulder absolute maximums. Cross slopes to be computed from lip of gutter. Butterfly sections (where driving lane is steeper than shoulder) are not permitted.

☐ 35. If both driving lane and shoulder have variable cross slopes, the 1/4 crown elevations to be shown on plan. 1/4 crown located 8 feet from curb face on all streets.

☐ 36. Show traffic index (T.I.) under typical sections. Residential T.I. = 5, Collector T.I. = 6, Secondary T.I. = 7 (T.I. = 8 if truck route), Major T.I. = 8 (T.I. = 9 if truck route), Primary T.I. = 9 (T.I. = 10 if truck route). Minimum street section = 3"AC/4"AB. The structural section for all streets shall be designed for a service life of 20 years as outlined in Chapter 600 of the Caltrans Highway Design Manual.

☐ 37. Barricade needed at temporary dead end streets.

☐ 38. Widening flare at 2:1, narrowing flare at rate to be determined by the City Engineer, each from the curb face. Install a minimum of three F-2 delineators with 8"x 24" target plates 25 feet (typical) on center along outgoing taper.

☐ 39. 2" x 4" headers required at edges of paving that are not adjacent to gutters or existing paving, except for the tapers.

☐ 40. Block walls connected with backup lot treatment will be placed at the top of any slopes adjacent to the street. Backup walls to be outside of City right-of-way. Details of other than standard walls required on plans. Show height of wall on plan.

☐ 41. Check for existing sewer lateral and show and label any proposed or existing laterals. (Applies to projects where there are existing sewers.) Laterals to be built before paving.

☐ 42. Slope letter needed if cut or fill at end or side of subdivision street adjacent to subdivision boundary extends onto private property.

☐ 43. Alley approaches, which drain a portion of an alley with a valley gutter, will be depressed at the rear of the approach. Show flow line elevation on plans.

☐ 44. Minimum 20-foot long by 2-foot wide by 2.5-inch thick A.C. drainage aprons required at downstream end of stub streets.

☐ 45. On all major street intersections (two or more major streets) 88 feet wide and greater, traffic signal conduit and pullboxes shall be shown on the plans even if no signals are being built at this time.

☐ 46. If project conditions require fencing, construction limits of required chain link fence, etc., to be shown on plans.

☐ 49. Show flow around tract on index map on title sheet, if necessary.

☐ 47. If flow is diverted from its existing course onto private property, a recorded drainage release letter from the affected property owners will be required.

☐ 48. Private engineer to use San Bernardino County method for drainage calculations (hydrology and H.G.L.). Assume ultimate upstream development.

☐ 49. Check to see if new street section will carry same flow as existing street section (critical where there is an existing ditch along street) without diverting flow across centerline.

☐ 50. n = 0.020 on residential streets (streets with driveways, parked cars, etc.) n = 0.015 on major streets (no driveways, little or no parking, etc.)

☐ 51. Check calculations on non-standard box culverts, etc.

☐ 52. Drainage structures checked for capacity. Check hydraulic calculations submitted by engineer.

☐ 53. Note size, length and "D" strength for pipe (1350-D minimum). Minimum diameter pipe 18 inches.

☐ 54. Storm Drain Pipe shall be RCP unless otherwise approved by the City Engineer.

☐ 55. Underground storm drain systems and open channels shall be designed for a 100-year storm. Sump conditions require a secondary overland freeflow to prevent flooding of

buildings should catch basin or storm drain system become blocked. A flowage easement is required for overland freeflow conditions

☐ 56. Ten-year storm to be carried between curbs and 100-year storm between right-of-way lines on all streets. Secondary, major and primary streets must have one driving lane clear in each direction in 10-year storms.

☐ 57. Grate catch basins not permitted.

☐ 58. Construct catch basins to minimize the number of cross gutters if there is a storm drain in the vicinity of an intersection.

☐ 59. A recorded drainage release letter needed if streets drain onto adjacent property owner's land.

☐ 60. Any block walls, ditches, etc., needed along tract boundary to prevent flooding (overland, from canals, etc.)? Show on plans.

☐ 61. Check at subdivision boundaries for any possible problems such as blocking drainage from or discharging drainage to adjacent land or conflict with existing or proposed improvements.

☐ 62. Check for possible ponding on streets and cross gutters and aprons.

☐ 63. For storm drains show H.G.L. and elevation of HGL to nearest 0.1' in profile. Show "Q" in streets, into catch basins and into storm drain system and designate Q_{10}, Q_{100}, etc. Show any flowby at catch basins. Show "Q" to the nearest 1 CFS.

☐ 64. Water surface elevations in catch basins minimum 6 inches below gutter flow line.

☐ 65. Check for cutoff walls, energy dissipators, etc., at outlets of storm drain systems. Also, headwalls, etc., at inlets.

☐ 66. No storm drain easements centered on property line and no storm drains located on property line. Minimum width storm drain easement 15 feet. Supplemental access easements may be required.

☐ 67. An encroachment permit is needed from San Bernardino County Flood Control District if connecting to a District drainage system.

☐ 68. Label private drainage system as such. Inlets of private drainage systems to be equal to or above H.G.L. of public storm drain they connect to or if tying into a catch basin, equal to or above the top of curb of the catch basin.

☐ 69. If proposed construction will affect adjacent driveways in any way, a written concurrence from adjacent property owners is required.

☐ 70. No "stick on" labels on plan originals. Duplicate mylars shall have a minimum thickness of 3 mil.

☐ 71. Any supporting calculations or pertinent data that would be required to allow complete checking of the entire design development package (including but not limited to closure

calculations for maps; hydrology and hydraulic calculations for storm drain studies, etc.) must be submitted with first check.

☐ 72. Show all street lights and label "x,xxx lumen street light.

☐ 73. Check storm drain against WQMP requirements.

☐ 74. Check Engineer's registration expiration date.

☐ 75. Show existing survey monuments.

FOR INFORMATION ONLY: Balance due on plan check fee must be paid prior to plan approval by City Engineer. Also, if R/W is required for the project, plans will not be approved until deeds are in and sent for recording.

The following notes must appear on the first sheet of the plan set.

GENERAL NOTES FOR STREET PLANS

1) All work shall be done in accordance with these plans and the State of California Greenbook "Standard Specifications," latest edition, and the Standard Drawings of the City of Highland and the County of San Bernardino

2) It shall be the responsibility of the Contractor to familiarize himself with the job site and the location of all underground facilities shown or not show on these plans. The City of Highland will not be responsible for any damage to underground facilities..

3) It shall be the Contractor's responsibility to obtain all necessary permits.

4) It shall be the Contractor's responsibility to call the City Engineer's Office at ***(909) 864-8732, ext. 240,*** for inspection 24 hours prior to performing any work. Work performed without calling for inspection shall be rejected and shall be removed solely at the Contractor's expense.

5) Utility Contractors shall be responsible for obtaining compaction tests of all trench backfill and street subgrades and submitting them to the City Engineer for approval. Notify City Engineer's Office at ***(909) 864-8732, ext. 240***, 24 hours prior to tests.

6) The structural sections shown on these plans are tentative. At the completion of rough grading, a material report and the proposed structural section shall be submitted by the design engineer to the City Engineer for review and evaluation. Approval will be given when all structural section requirements prevailing at time of submittal have been met. Current minimum structural section is 3" AC over 4" Class II AB. It shall be the design engineer's responsibility to contact the City Engineer's office to obtain the latest structural section requirements.

8) Locations of driveway approaches shall be added to the precise grading plan if not on original street plans. Any water or sewer laterals constructed within driveway approaches shall be relocated at the Contractor's expense. Note that 4' of sidewalk at a 2% slope shall be maintained around drive approaches in accordance with State and Federal requirements.

9) The Contractor shall satisfy himself that estimated quantities shown are correct before bidding on any item.

10) The Contractor shall maintain dust control at all times. Work site and exterior streets shall be in a neat, clean, hazard free, orderly state throughout construction. Site shall be cleaned upon request of the inspector.

11) All existing pavement to be removed shall be sawcut or wheelcut and removed to clean straight lines.

12) At all locations where new pavement joins existing, the existing pavement shall be coated with an asphaltic emulsion.

13) The Contractor is responsible for the protection of all utility valves, boxes and covers, and adjusting of all water valve boxes and covers to finish grade.

14) The Contractor shall reset manhole rings to surrounding A.C. pavement grade.

15) The Private Engineer signing these plans is responsible for the accuracy and acceptability of the work hereon. In the event of discrepancies arising during construction, the Private Engineer shall be responsible for determining an acceptable solution and revising the plans for approval of the City Engineer.

16) The Contractor shall call in a location request to Underground Service Alert (USA), phone number 811, two working days before digging. No inspection will be provided by the City Engineer's office, and no construction permit issued involving excavation for underground facilities will be valid unless the applicant has been provided an inquiry identification number by USA.

17) All irrigation lines encountered during construction shall be replaced with 12 gauge minimum dipped and wrapped-welded steel pipe.

18) Approval of these plans by the City or its agents does not relieve the developer from the responsibility for the correction of errors and omissions discovered during construction. Upon request, the required plan revisions shall be promptly submitted to the City Engineer for approval.

19) When improvements are to be placed on native soil which consists of a rocky material, the sub-grade shall be prepared by removing all rocks which protrude above the sub-grade and all voids or depressions shall be filled with a fine grade material of a quality better than the native material.

20) No work shall commence within public right of way without obtaining a Public Improvements Permit and notifying the City Inspector to schedule a preconstruction meeting 24-hours prior to start of work.

21) Asphalt concrete shall be spread and compacted in at least two lifts, with each lift no thicker than **2"**. The City prefers that the final lift not be placed prior to the completion of construction of the residences/buildings within the development. Should the developer choose to pave the full depth of A.C. pavement prior to the completion of building construction, no final inspection of the pavement surface shall be performed. Upon the completion of building construction, a final inspection of the pavement surface shall be performed and any noted deficiencies shall be repaired in accordance with the City's Pavement Repair Policy.

22) After all houses are constructed, **if the final lift was placed prior to completion of construction,** all streets within the tract shall be slurry sealed prior to final bond release or a cash payment made in lieu of slurry seal.

23) Two coats of paint shall be used for pavement striping and markings on local and collector streets. Thermoplastic shall be used on secondary highways, major highways, and primary arterials.

24) It shall be the responsibility of the developer to comply with the provisions of Section 8771 of the Business and Professions Code as amended by Assembly Bill 1414, with respect to all monuments (refer to Section 3).

PROFILE CHECKLIST

- ☐ 1. Show datum elevation at both ends of each street. Benchmark reference on each sheet.
- ☐ 2. Show horizontal and vertical scales.
- ☐ 3. Names and stationing of intersecting streets.
- ☐ 4. Label and show stations and elevations at the beginning and end of all curb returns, vertical curves, horizontal curves, transition sections, grade breaks and beginning and end of improvements.
- ☐ 5. Indicate length of curb returns and length of horizontal curves. Draw curb returns full length, not twice tangent distance. 1/4 delta points to be shown on all returns and elevations.
- ☐ 6. Label all grade lines and profiles. Also show size of curb face.
- ☐ 7. Profile of existing centerline with elevations at least every 50 feet (except for projects involving mass grading).
- ☐ 8. Profile of existing ground at property line (except for projects involving mass grading).
- ☐ 9. Profile of existing E.P. with elevations at least every 50 feet.
- ☐ 10. Show connection with or future design to existing improvements along with existing elevations. Show grade on existing improvements.
- ☐ 11. Check profile of 1/4 crown if required. Show grade.
- ☐ 12. Grades of major and secondary streets should not exceed 6%. Residential streets shall not exceed 12% or as required by the Fire Department.
- ☐ 13. Check elevations shown in profile against those shown in the plan view.
- ☐ 14. Check difference between T.C. and centerline against what typical section shows.
- ☐ 15. Minimum centerline and top of curb grade is 1%, show grades in profile. If profile on existing street is less than 0.5%, engineer to have prior approval from the City Engineer. No new streets to have grades less than 1%.
- ☐ 16. Use vertical curves for all grade breaks in excess of 0.5% (Parabolic V.C.'s only). Do not use portions of vertical curves. Design speeds are 30 miles per hour for local, 45 miles per hour for collectors, 50 miles per hour for secondary and 55 miles per hour for majors.
- ☐ 17. Show tangent grades at PRVC or PCVC.

☐ 18. Show P.I. elevations on vertical curves.

☐ 19. Elevations every 50 feet on vertical curves (or fractional part thereof).

☐ 20. Check sight distance: (both horizontal and vertical). Intersections shall be designed in accordance with Caltrans 7-1/2 second Corner Sight Distance criteria.

Design Speeds: 30 mph - local streets
45 mph - collector streets
50 mph - secondary streets
55 mph - major streets

☐ 21. Show transition between different types of curbs.

☐ 22. Extend profiles beyond end of improvements as necessary to justify grades.

☐ 23. If future curb is to go over canal, etc., check to see there will be adequate clearance between bottom of curb and top of canal cover.

☐ 24. Use straight grades for cross gutters unless there are unusual circumstances.

☐ 25. Maximum 2.5% grade coming into cross gutter. P.I. for vertical curve to be minimum of 50 feet back from flow line of cross gutter. On streets where the grade is 5% or greater, a grade of 4.5% into the cross gutter is acceptable.

☐ 26. Curb returns to be designed by plane method of top of curb. Show P.I. and elevations. Show tangent grades if different from T.C. grades.

☐ 27. Absolute minimum fall around or away from curb returns shall be 1%. Vary curb face if necessary. (Hold the T.C. elevations and vary the flow line.)

☐ 28. Show profile going into and out of return with grades.

☐ 29. Check shoulder around curb returns for excessive slope (maximum 6%).

☐ 30. Check through streets for driveability.

☐ 31. Show structures to scale (catch basins, etc.). Note critical flow line elevations.

☐ 32. Show and label any existing or proposed underground construction that may conflict or enter into the design of the proposed improvements.

☐ 33. Show existing or proposed flow coming into and going out of new improvements.

☐ 34. Check for flat spots at high and low points of vertical curves. Vary curb face height to provide minimum flow line grade of 0.5% (vary the flow line, hold the T.C.).

☐ 35. Use variable curb face height on cul-de-sacs, knuckles, etc., to help alleviate flat slopes. Minimum flow line grade is 1%. Maximum street grade into gutter at back of cul-de-sac shall not exceed 3%. On flat cul-de-sacs with a 0.5% grade in cul-de-sac high-point, omit vertical curve at cul-de-sac high point.

☐ 36. If curbs are variable height, show T.C. and F.L. elevations and curb height. Show flow line profile with grade.

☐ 37. Check for car dragging going into driveway or alley. Grade for a residential driveway shall not exceed 12%. Submit a profile for each existing driveway showing existing and

proposed elevations, grades, and dimensions of transition for match up. Clearly specify the limits and elevations of the transition on the plan.

☐ 38. On "grading to drain" situations, check for sufficient elevations and stations to allow grading to be done (critical where grading is to be done in flat area).

☐ 39. Propose grade checked against City plans, if any.

☐ 40. All plans must be complete within themselves and not contingent on future or adjacent construction.

☐ 41. On curb inlets or outlets, the top of the curb remains constant with the flow line varying up or down to allow for the facility. Minimum flow line grade is 1%.

☐ 42. Where the property being developed is below the level of the street, a driveway profile is required to show that 100-year street flows will not enter onto private property by way of the driveway.

☐ 43. A minimum velocity of 3 feet per second flowing half full shall be maintained in permanent closed conduit storm drains.

☐ 44. A minimum slope of 0.5% shall be used for permanent storm drains. An absolute minimum slope of 0.2% on storm drains larger than 36 inches in diameter may be used if prior approval is obtained from the City Engineer.

☐ 45. Check storm drain against WQMP requirements.

8.0 UTILITIES

The design engineer is responsible for identifying and contacting all utilities having any facilities that may be affected in any manner whatsoever by the proposed work included on the engineering plans.

Below is a general list of utilities doing business in Highland.

- **Time Warner Cable Television**
  1500 South Auto Center Drive, Ontario, CA 91761
  Phone: (909) 721-8589

- **East Valley Water District (Water and Sewer)**
  3654 Highland Avenue, Suite 18, Highland, CA 92346
  Phone: (909) 888-8986

- **AT&T (Telephone Planning)**
  3037 Adams Street, Riverside, CA 92504
  Phone: (951) 359-2511

- **Verizon (Telephone Network Engineering and Planning)**
  1980 Orange Tree Lane, Suite 100, Redlands, CA 92374-7880
  Phone: (909) 748-6649

- **Southern California Edison (Distribution Facilities)**
  287 Tennessee Street, Redlands, CA 92373
  Phone: (909) 307-6749

- **Southern California Edison (Transmission Facilities)**
  300 North Pepper Avenue, Building “B”, Rialto, CA 92376
  Phone: (909) 820-5532

- **Southern California Gas Company**
  1981 West Lugonia Avenue, Redlands, CA 92374-9796
  Mailing Address: PO Box 3303, Redlands, CA 92374-9796
  Phone: (909) 335-7772

- **San Bernardino Valley Municipal Water District**
  1350 South E Street, San Bernardino, CA 92408-2725
  Mailing Address: P.O. Box 5906, San Bernardino, CA 92412-5906
  Phone: (909) 387-9230