

IV. STREET IMPROVEMENT PLAN CHECKLIST

A. PREPARATION OF SHEETS

- _____ 1. Plan and Profile will be drawn on 24" x 36" polyester base film using County Standard Title Block. (See Exhibit A.)
- _____ 2. All work must be clearly reproducible for microfilming. Special care shall be made to ensure that lettering density and background density is uniform on each sheet to ensure even contrast throughout the sheet. Mylars must be signed with "black ink" only.
- _____ 3. Minimum letter size shall be 0.12 inches in height due to microfilming and minimum line weight shall be "0" (Leroy pen). Letter spacing should be no less than 1/4 of the letter height used. Cursive writing shall not be used except for signature. The basic plan and profile scale should be 1" = 40' horizontal and 1" = 4' vertical, or 8' vertical (for steep grades).
- _____ 4. Self-adhesive or add-on labels and certificates are not acceptable on final plans.
- _____ 5. Color shading shall be selectively used on sections only. Do not use dark tones and avoid color on plan views.
- _____ 6. Use details liberally. Too many arrows around a point or other congestion will cause light reflection in the microfilming process and make prints hard to read. Details, if possible, should be drawn on the same page to which they apply.
- _____ 7. Place a sheet index in the lower right hand corner per Exhibit A.
- _____ 8. Show the following note when cash is collected for future facilities that cannot be constructed at this time: Cash-In-Lieu Note: An amount of \$ (dollars) has been placed into account #20000-3130100000-230106 for the future construction of (facility type) located on (street name or location) . Receipt Number _____ dated _____.
- _____ 9. Identify City/County jurisdiction (if applicable) and add Signature Blocks for both.

B. INDEX MAP

- _____ 1. Shown on first sheet (Title Sheet).
- _____ 2. Street names. Alpha designations ok for the first submittal, but names are required prior to mylars. Identify private streets (symbol/note) and show existing streets in the immediate vicinity.
- _____ 3. Lot lines and numbers.
- _____ 4. Direction of drainage flow in all streets.

- _____ 5. Points of entry and exit of present watercourses with Q10 and Q100 referenced for them.
- _____ 6. Locations of drainage structures, existing & proposed, with Q10 and Q100 referenced for them.
- _____ 7. Adjacent developments (Tract Number or Map Book or Parcel Map Number or APN)
- _____ 8. Show location of block walls in or adjacent to right-of way.
- _____ 9. Street trees. (For quantity verification) Do not show on street plan sheets.
- _____ 11. Streetlights. Must match Streetlight Plan. Do not show on street plans sheets. Show quantity in "Construction Notes and Quantity Estimate" on Title Sheet.
- _____ 12. All drainage easements or other easements required by design. Show how obtained (Book and Page, etc.), excluding privately maintained easements.
- _____ 13. Scale 1" = 200' or larger.
- _____ 14. Show culverts, catch basins, cross-gutters and other drainage structures.
- _____ 15. Show two access roads and alignments from County maintained roads and label including off-site right-of-way documents. (For tracts and Parcel Maps only.)
- _____ 16. Note on plan indicating maintenance of BMPs, add a date for agreement signed and no date if L&LMD annexing.

C. VICINITY MAP

- _____ 1. Shown on first sheet.
- _____ 2. Project site in relation to streets and highways within a mile radius. A photocopy of Thomas Brothers Guide and/or any other street maps is not acceptable.
- _____ 3. Identify Township _____, Range _____, Section _____, or provide a hypothetical T _____, R _____, S _____ for Rancho areas.

D. TITLE BLOCK

- _____ 1. Shown on all sheets in lower portion of the sheet. (See exhibit "A".)
- _____ 2. Case Number (C.U., P.U., P.P., P.M., or Tract) (See exhibit "A".)
- _____ 3. Registered engineer's number and expiration date in block provided.
- _____ 4. Engineer's Seal shall be stamped or shown in block provided.
- _____ 5. Date plans are prepared. Scale of plan.
- _____ 6. Sheet Number: Sheet _____ of _____.

- _____ 7. Engineer's address and phone number in block provided. Self-adhesive label is not acceptable.
- _____ 8. The tract or parcel map schedule per the conditions of approval, summary of findings, land use data and Ordinance 460 Article Ten, shall be noted as shown in Exhibit "A".
- _____ 9. Show benchmark description on first sheet and refer to first sheet on other sheets; refer to County Precise levels or Federal USGS, Army Corps agency benchmarks if feasible. State and Flood Control are also acceptable. All reference benchmarks shall be of a permanent nature and readily identified in the field.
- _____ 10. If the roads are not to be maintained by the County, place "NOT COUNTY MAINTAINED ROADS" in large bold letters on the index map and plans above the title block, and place this note under the typical sections where applicable.
- _____ 11. If the project is below sea level, rather than display negative elevations, make an adjustment to have positive elevations and note on plans.

DIGALERT	
DIAL BEFORE YOU DIG	TWO WORKING DAYS BEFORE YOU DIG
TOLL FREE 1-800-227-2600 1-800-422-4133	
A PUBLIC SERVICE BY UNDERGROUND SERVICE ALERT	
NOTE: WORK CONTAINED WITHIN THESE PLANS SHALL NOT COMMENCE UNTIL AN ENCROACHMENT PERMIT AND/OR A GRADING PERMIT HAS BEEN ISSUED.	
<small>THE PRIVATE ENGINEER SIGNING THESE PLANS IS RESPONSIBLE FOR ASSURING THE ACCURACY AND COMPLETENESS OF THE DESIGN. IN THE EVENT OF DISCREPANCIES ARISING FROM COUNTY APPROVAL OR DURING CONSTRUCTION, THE PRIVATE ENGINEER SHALL BE RESPONSIBLE FOR DETERMINING AN ACCEPTABLE SOLUTION AND REVISING THE PLANS FOR APPROVAL BY THE COUNTY.</small>	
MARK BY	DATE
ENGINEER	REVISIONS
APPR	DATE
	COUNTY

SEAL-COUNTY	COUNTY OF RIVERSIDE TRANSPORTATION DEPARTMENT APPROVED BY: ALAN D. FRENCH DATE RECOMMENDED DATE	SEAL-ENGINEER	ENGINEER'S NAME: ADDRESS: PHONE NUMBER: PREPARED BY: R.C.E. NO. DATE
-------------	---	---------------	---

PLEASE USE THE ELECTRONIC SEAL FOR THE COUNTY'S ENGINEER.
(ALAN D. FRENCH, RCE 45702, 12-31-10).

(EXAMPLE)	INDEX OF SHEETS:		} PROVIDE ON FIRST SHEET ONLY, IN LOWER RIGHT-HAND CORNER.
	SHEET NO. (S)	DESCRIPTION	
	1	TITLE SHEET	
	2-5	PLAN AND PROFILE	
	6-8	STORM DRAIN	
	9	DETAILS	
	1-2	SIGNING AND STRIPING	
	1	STREET LIGHT	
	1-6	LANDSCAPE PLANS	
BENCHMARK:	I. P. NO.		SHEET NO.
	COUNTY OF RIVERSIDE		IMPROVEMENT PLAN NUMBER
	SCHEDULE " "		(ASSIGNED AT TIME OF SUBMITTAL)
SCALE: H ₁ V ₁	FOR:	W.O.	DE _____ SHTS
		COUNTY FILE NO.	
CASE TYPE:		SHEET IDENTIFICATION:	
TRACT/ PARCEL MAP		TITLE SHEET	
CU (CONDITIONAL USE)		STREET NAMES	
PP (PLOT PLAN)		STORM DRAIN	
PU (PUBLIC USE)		ETC.	
MS (MISCELLANEOUS)		"A - D" FOR TRACTS OR "E - H" FOR PARCEL MAPS ONLY. PER ORDINANCE 461.139. BASED ON THE LOT SIZE	

EXHIBIT "A"

E. GENERAL NOTES

NOTE: Write down applicable notes only.

- _____ 1. It shall be the responsibility of the developer/owner or contractor to apply to the Riverside County Transportation Department, Permit Section, for an Encroachment Permit for all work performed within public right-of-way, dedicated and accepted for public use; and to be responsible for satisfactory compliance for all current environmental regulations during the life of construction activities for this project. Additional studies and/or permits may be required.
- _____ 2. The contractor/developer shall be responsible for the clearing of the work area, and relocation costs of all existing utilities. This includes undergrounding of existing overhead lines along the project frontage as required by the conditions of approval. Permittee must inform County of construction schedule at least 48 hours prior to beginning of construction.

Phone: (951) 955-6790 for Permit Cases (C.U., P.U., P.P., or Voluntary),
Cabazon and area west.

Phone: (951) 955-6885 for Parcel Maps and Tract Maps.

Phone: (760) 342-8267 for Permit Cases east of Cabazon.
- _____ 3. The developer will install street name signs conforming to County Standard No. 816.
- _____ 4. All work shall conform to the requirements of the Riverside County Transportation Department Improvement Standards and Specifications, latest edition, County Ordinance No. 461 and subsequent amendments.
- _____ 5. It shall be the responsibility of the developer to notify the engineer to install street centerline monuments as required by Riverside County Ordinance No. 461 (Tracts and Parcel Maps only). All existing survey monuments shall be protected in place or relocated by a licensed professional prior to construction.
- _____ 6. All underground facilities, with laterals, shall be in place prior to paving the street, including, but not limited to, the following: sewer, water, electric, gas, storm drains.
- _____ 7. Curb depressions and driveway approaches will be installed and constructed according to County Standard No. 206 and/or No. 207, as directed in the field.
- _____ 8. It shall be the responsibility of the developer or contractor to apply to the California Department of Transportation (Caltrans) for an Encroachment Permit for all work performed within the State right-of-way.
- _____ 9. It shall be the responsibility of the contractor or developer to install and maintain all construction, regulatory, guide and warning signs within the project limits and its surroundings to provide safe passage for the traveling public and workers until the final completion and acceptance of the project by the County.

A traffic control plan must be submitted for review to the Permits Section or Inspection Section prior to obtaining an encroachment permit.

- ____ 10. All street sections are tentative. Additional soil tests (*) be taken by the County after rough grading to determine the exact street section requirements. Use Standard No. 401 if expansive soils are encountered. (* shall for Tract maps and Parcel Maps - may for Permit Cases.)
- ____ 11. Asphaltic Emulsion (Fog Seal) shall be applied not less than fourteen days following placement of the asphalt surfacing. Fog Seal and Paint Binder shall be applied at a rate of 0.05 and 0.03 gallon per square yard respectively. Asphaltic emulsion shall conform to Section 37, 39 and 94 of the State Standard Specifications.
- ____ 12. Prime coat is required prior to paving on all grades in excess of ten percent.
- ____ 13. Install street trees in accordance with Ordinance No. 461 and the Comprehensive Landscaping Guidelines (choose three species and name them here).
- ____ 14. Streetlights shall be installed in accordance with the approved street lighting plan.
- ____ 15. As determined by the Transportation Director, the developer is responsible as a minimum for road improvements to centerline, and may be required to reconstruct existing pavement, including base, and matching overlay required to meet the structural standards for the current assigned traffic index.
- ____ 16. Only landscaping consisting of grass and parkway trees may be installed within parkways on local residential streets without separate landscape plans. All other types of landscaping in these areas, and all landscaping on all other streets, shall require separate landscape plans. All landscaping encroachments shall conform to Riverside County Comprehensive Landscaping Guidelines dated October 2009.
- ____ 17. Any private drainage facilities shown on these plans are for information only. By signing these improvement plans, no review or approval of those private facilities is implied or intended by the Riverside County Transportation Department.
- ____ 18. a. Construction projects must obtain a National Pollutant Discharge Elimination System (NPDES) permit. Owners/developers are required to file a Notice of Intent (NOI) with the State Water Resources Control Board (SWRCB), prepare a Storm Water Pollution Prevention Plan (SWPPP) and Monitoring Plan for the site.

b. Prior to any construction, the developer shall provide the County a copy of the NOI with a valid WDID number.
- ____ 19. The developer shall be responsible for the installation of additional signs and markings not included in the signing and striping plan within the project areas, or on roadways adjacent to the

project boundaries, upon the request of the Director of Transportation or his designee to improve traffic safety on the roads under the jurisdiction of the developer.

- ____ 20. Existing storm drain pipes / culverts (whether to be connected to, extended, adjusted, drained to, or just in the project vicinity) must be repaired, and /or cleaned to make them functional and acceptable as directed by the Transportation Department.

- ____ 21. It shall be the responsibility of the developer/contractor to apply to Riverside County Flood Control (RCFC) for permits when any storm drain pipe needs to be connected with a RCFC facility and add Permit # _____ on the plan.

- ____ 22. For all driveway reconstruction beyond right-of-way, proof of driveway owner notification is required prior to construction.

F. CONSTRUCTION NOTES AND ESTIMATE OF QUANTITIES

Show "Construction Notes and Estimate of Quantities" on first sheet of improvement plans. Include quantities as part of construction notes. (See subsection H, Item 25, below) These quantities should match the quantities on the Construction Cost Worksheet (Section II), which is also used for bonding.

G. TYPICAL SECTION

- ____ 1. Typical sections for all streets (refer to County Road Improvement Standard Sections).

- ____ 2. Dimensions of right-of-way, pavement, and parkway.

- ____ 3. Slopes to adjacent property lines.

- ____ 4. Percent cross fall (include percent cross fall on existing pavement) must be shown. (1.5% minimum required on proposed match up pavement.) Where it is demonstrated that the 2.5% maximum must be exceeded, the steeper cross slope will be used in a shoulder area, not in the driving lane. A maximum of 4% grade break may be allowed at a lane line.

- ____ 5. Curb sections and types. Use 6" on road types up to and including Secondary. Use 8" on road types wider than Secondary. However, do not mix outboard curb heights on the same roadway. For median curb, use Type-D 8" curb irrespective of outboard curb height.

- ____ 6. Saw cut edge, 0.10' header cut and feather overlay (2' min) where existing pavement is being cut. If Materials Lab allows the existing pavement to remain a leveling course may be required.

- ____ 7. Preliminary structure "R" Value for street section, per Soils Report.

- ____ 8. Traffic Index, T.I. (See Standard No. 114).

- ____ 9. Aggregate base thickness - calculated from preliminary "R" and T.I. values. (0.50' min)

- ____ 10. Asphalt concrete thickness - T.I. value, per Ordinance 461 specifications, Section 8.07.
- ____ 11. Access roads conditioned for Project on General Plan Roads need to be designed with T.I. 7.0 and alignment to a Collector Standard.(103)
- ____ 12. Street names.(For both public and private streets)
- ____ 13. Any pertinent easements.
- ____ 14. Supplemental typical sections required for different widths, structural sections, half streets, etc.
From Sta_____ to Sta_____.
- ____ 15. Location of pavement repair for utility installation on existing pavement must be a full lane width (minimum 12') per Standard 818.
- ____ 16. Show and label future median, or other facility, which cannot be constructed at this time. (Also see "Cash-In-Lieu-Of-Construction" note for title sheet per Section A.)
- ____ 17. Show and label joint utility trench in parkway. (per STD 817)
- ____ 18. See Appendix A 17 for structural section calculation.
- ____ 19. If concrete is required at the project entrance a structural section and details are required. Color and patterns to be determined by the Director of the Transportation Department.

H. PLANS

- ____ 1. North Arrow: Point up or to the right if possible.
- ____ 2. Stationing should increase to the North or to the East. (Should a conflict occur with the North arrow direction, then stationing should increase from left to right.) For curved streets or existing streets, stationing may go in either direction. Do not use negative stationing.
- ____ 3. Centerline stationing shown on plans.
- ____ 4. Stationing and street names at intersections with equations (if any).
- ____ 5. Stationing of all EC's and BC's. Stationing of all BCRs and ECRs. (Following the Driving Direction making a right hand turn, closest to the curb line.)
- ____ 6. Stationing of end of improvements.
- ____ 7. Stationing of end of curb and gutter.
- ____ 8. Scale and 4" graphic scale.
- ____ 9. Names of all streets shown on sheet.
- ____ 10. Bearings of all streets on centerline, basis of bearing shown for permit cases. Plans should match final map bearings.

- _____ 11. Curb return data (delta, tangent, radius, and length).
- _____ 12. T.C. (or flow line) of all BCRs and ECRs.
- _____ 13. Flow line and elevations on cross gutter flowline intersections and centerline crossing.
- _____ 14. Centerline curve data; also short and long side of curbed sections.
- _____ 15. Lot lines and lot numbers.
- _____ 16. Note connections to existing improvements.
- _____ 17. Show improvements to be constructed with solid lines. Existing or future improvements with dashed lines and label.
- _____ 18. Tapers on pavement shall be minimum 2:1 for widening traffic on low speed roads; 10:1 for merging traffic on low speed roads. For roads having a speed greater than 35mph, merging lanes or lane drops shall use Caltrans standard: Length (ft) = Design Speed (mph) x Distance Traffic Moves Laterally (ft). Pavement less than 500' in length is normally not considered a lane of traffic (lane will not be striped). If taper moves pavement closer to existing poles, mitigation will be required. (See STD 820)
- _____ 19. Limits of different curb types and or dikes.
- _____ 20. Label curb types, cross gutter and spandrels, and all structures. No cross gutters will be allowed to cross a secondary highway (STD 94) or wider.
- _____ 21. Show detail views of all structures that are non-County or State standard. Give all pertinent specification notes. Provide justification notes on the plans for all deviations from County Standards, and provide a design exemption per Sec I-J. #21
- _____ 22. Refer to County Road Improvement Standard number if applicable to structure or work.
- _____ 23. Show all concrete pipes. Note size, length, invert elevation, and "D" strength of RCP or class.
- _____ 24. Show all storm drains, facilities, and their sizes, if any, in dash or lines screened at 30%, on street improvements plans. (70% ink)
- _____ 25. Show construction notes wherever necessary to clarify construction details. Construction notes for all items shall be placed on title sheet with quantities and must match items on the Cost Worksheet. Show only applicable construction notes on each plan sheet, without quantities. See Sec IV-F
- _____ 26. Show existing pipe lines, weir boxes, mail boxes, irrigation systems, power poles with numbers, trees, etc., in right-of-way and include notes as to their disposition if encroaching on proposed improvements. All existing overhead distribution lines are to be under grounded and should be noted on the plans as such with the pole notation. For poles within 4' of EP, relocation or

undergrounding is required. If the pole is outside of right-of-way joint use agreement may be required. See Appendix for the procedure.

- ____27. Notarized letters of permission are required for any grading on property that is beyond tract boundary. See the appendix for grading/drainage letter. Easements may be required in lieu of the above letters if directed by the Transportation Department. Required easements must be recorded prior to plan signature or map recordation which ever occurs first. This note must be inked on the plan: "A notarized letter of permission accepting this slope construction and/or drainage is in file of Riverside County Transportation Department. Date of letter: _____"
- ____28. All required public drainage easements shall be a minimum of 20' wide and shall be noted as to dedication and on-going maintenance. For non-County maintained drainage facilities, notarized letters of permission are required from property owners. Private easements may be less.
- ____29. At intersections a minimum of 50' tangent from the flow line shall be provided before starting or ending a horizontal curve.
- ____30. Street intersections shall be at 90 degrees. Five degrees shall be the maximum allowable skew.
- ____31. Show existing right-of-way and topography a minimum of 300 feet beyond the end of proposed improvements. Additional topography and right-of-way may be required; engineer should keep in mind sight distance, slope construction, and drainage concerns.
- ____32. Driveway approaches within cul-de-sac turn around areas and knuckle areas shall be shown when the lot frontage is less than 50 feet in width or for commercial developments. Driveways should be minimum 5' away from property line on each side per Std 208 and call out construction note and width per Std 206 or 207 or 207A,
- ____33. All roads to be designed per Caltrans sight distance requirement. For off-site access roads on General Plan alignments, minimum design speed and T.I. should be per Std 114.
- ____34. Intersection sight distance shall be per Caltrans Highway Design Manual, Tables 201.1 and 405.1.A and fig 201.6.
- ____35. A minimum of two points of monumentation on street centerline shall be shown and provided on PP, PUP, CUP and MS (Miscellaneous) projects. The monumentation shall include a description, and a reference to a recorded map for verification purposes. For projects that include recording documents, i.e. map, deeds, easements, etc, no monuments need to be shown on street plans. All existing survey monuments are to be shown, called out and protected or properly relocated. All existing survey monuments are to be calculated out and protected or properly moved prior to construction.

- ____ 36. Per County Standard No. 212, A.C. dike is required where fill slopes are steeper than 4:1, material is susceptible to erosion, where roadway gradient exceeds 3%, or if a trail is in or near the parkway .
- ____ 37. Contours shall be provided on projects where no grading plan is required by Building and Safety.
- ____ 38. Dead end and stub streets longer than 150 feet require a paved fire turn-a-round within right-of-way or public easement as approved by the Transportation Department.
- ____ 39. If the median is not to be constructed, the following note shall be placed on the street plan and landscape plan cover sheet and applicable sheet to satisfy the median requirement. Cash-In-Lieu Note: An amount of \$____ (dollars) has been placed in Account #20000-3130100000-230106 for the future construction of ____ (facility type) located on ____ (street name or location) which is not feasible to build at this time. Receipt Number _____ dated _____.
- A copy of the form (Appendix A 10) and cost estimate for future medians, including landscaping, shall be forwarded to the LLMD Coordinator in the Transportation Department for annexation.
- ____ 40. Label right of way showing instrument number and date of recordation. If additional right of way is to be dedicated provide note and space for call out.
- ____ 41. Matchlines shall be chosen at “round” stations wherever possible or BC, EC, PRC, BCR, ECR (i.e.:45+00.00 not 44+97.62). Show matchline in plan and profile. Use the format: “Matchline Sta 45+00.00 See Sheet #4”
- ____ 42. For “T” intersections of local roads, an access ramp shall be installed across the right hand return or as directed.
- ____ 43. Need Caltrans Permit number on plans if near or includes state right-of-way work.
- ____ 44. Need RCFC Permit number on plans if connecting to existing RCFC facility.
- ____ 45. When project requires coordination with TIP it must be noted on the Plan Title Sheet and applicable sheet.
- ____ 46. Show existing trees in or near the road and call out its disposition. For tree removals, environmental clearance will be required and can be at the planning stage with the project or separate.

I. PROFILE

- ____ 1. Scale, horizontal and vertical.
- ____ 2. Profile or centerline of existing and perimeter streets or ground line (dashed).
- ____ 3. Finish centerline grade (heavy solid line)

- _____ 4. Existing ground line at left and right property or improvement center line shall be shown if no on-site grading is proposed. For work within a project that has a grading plan, no existing ground line in the profile is required on curb lines, but may be shown at the applicant engineer's option. Ground line in profile view and roadside grading in plan view must be shown on any work outside the limits of the map boundary.
- _____ 5. Finish top of curb grades, which will be a three-line profile with centerline. (Heavy solid lines)
- _____ 6. Label all grade lines and profiles; show percent of grade on centerline and curb line.
- _____ 7. Stations and elevations at beginning and end of improvements.
- _____ 8. BVC, EVC, and P.I. stations with elevations. No grade brakes at the BVC, EVC, BCR or ECR. Do not show vertical curve data on plan view.
- _____ 9. Length of vertical curve and elevations with circle every 25 feet on vertical curves. Refer to Caltrans fig. 201.4, and 201.5 for vertical curve length. 100' minimum unless approved by Transportation. Design speed may be labeled on the profile.
- _____ 10. Extend profile beyond end of improvement on existing streets to justify grade (300 feet minimum). If new road intersects existing street, show profiles on existing street.
- _____ 11. Elevation with circle and station on all grade breaks (identify with G.B. or V.P.I.) Design profiles shall not have consecutive grade breaks within 300'. Use tangents and vertical curves.
- _____ 12. Indicate lengths of curb returns. Show to true scale. Show elevations at $\Delta / 4$.
- _____ 13. Minimum fall around curb returns with no cross gutters, gutters around knuckles and cul-de-sacs shall be 1.0% minimum, however a 0.5% minimum is allowed with prior approval. A minimum of 2.0% cross fall is required from the center of a cul-de-sac to the gutter high point. A grade break up to 2% is allowed at the high point on the curb line of a cul-de-sac. A cross fall of 2% minimum is required for knuckles.
- _____ 14. Plane method shall be used in curb return design. See appendix for worksheet.
- _____ 15. Stationing at bottom of profile.
- _____ 16. Names and stationing at intersecting street points.
- _____ 17. Structures to scale, note critical F.L. elevations.
- _____ 18. Use and show grade for cross gutters, show station and elevation at gutter lips and at flow line. The elevation between lip and F.L. is 0.16' and the elevation between the edge of gutter and F.L. is 0.13'. Mid-block cross gutters are not allowed. If they are pre-approved, then a minimum grade shall be 0.50%, however a minimum of 1% is preferred.

- ____ 19. Use vertical curves for all grade break differentials in excess of 0.50%, but do not create flat vertical curves where drainage is a problem, and do not design a series of consecutive grade breaks trying to follow existing pavement. Grade breaks should be avoided as much as possible and not used for convenience and avoiding extra work. Grade breaks should not be closer than 100' and the total grade breaks should not exceed 0.5%.
- ____ 20. Show profile of all proposed ditched or piped drainage facilities.
- ____ 21. Design speed shall be determined from the Transportation Department Standard No. 114. The terrain types refer to the existing ground prior to construction.
- ____ 22. Maximum street grade is 16% and the minimum is 0.50%. However, every effort should be tried to exceed the 0.50% and should it become absolutely necessary to use 0.50% then it may be permitted. If centerline grade is less than 1%, concrete curb and gutter will be required, no AC dike. Other grades may be allowed as approved by the Director of Transportation. Profile grade of the streets should coincide with the existing contour gradient of the property unless the existing profile does not meet current design standards and road classifications. In this case, the whole road width is to be reconstructed to meet the standards as directed by the Transportation Department.
- ____ 23. Maximum grade for intersecting (minor) street at intersection is 5% for minimum tangent of 100' from flow line, or as approved by the Transportation Department.
- ____ 24. Grades to be shown in percent.
- ____ 25. Roads with A.C. Dike, single centerline profile grade is acceptable, no need for three line profile grades; but limits of cuts and fills should be shown on the plan, and more details should be provided at intersections.
- ____ 26. Street cross sections required at 25' intervals (or as needed) for any work involving the joining or overlaying of existing pavement. Inverted sections are not allowed for match up widening, overlay or removal will be required. The outboard crossfall must be the same, or steeper, than the inboard crossfall. Keep range of crossfall between 1.5% and 2.5%. Show existing and proposed crossfall. If the existing pavement cannot be saved, sections will not be required.
- ____ 27. Complete drawings of cross sections must be provided either on mylar sheets as part of the improvement plans or on 8 1/2" x 11" sheets in a binder as a supplement to the improvement plans and a note on the plans stating such. (Provide 2 copies)

J. DRAINAGE PLANS (SEPARATE OR WITH STREET SET)

- ____ 1. See Improvement Plans, First Plan Check Submittal, Note B for storm drain formats.

- _____ 2. Show culverts, catch basins, cross gutters and other drainage structures on the Index Map and Flow Chart located on the street plan title sheet.
- _____ 3. Give specific locations i.e., stationing, of all drainage structures on the plan and profile sheets.
- _____ 4. Show profile for all culverts, ditches, and channels with stations, lengths, invert elevations, V and Q100, Q100 hydraulic grade lines, etc. For on grade catch basins, the flow in the connector pipe is the flow intercepted by the catch basin in a 100-year event, not the Q100 in the street.
- _____ 5. 2-foot minimum free board from the road centerline profile grade to the water surface is required in culvert design. Minimum culvert size is 18". Plastic pipe is allowed if all criteria is met. See appendix for requirements.
- _____ 6. Show right-of-way, roadway section, and existing ground profile grade for the entire length of culvert and beyond, utility crossings, etc., on the culvert profile cross section. Address any clearance problems. Do not place storm drain in parkway or under P.C.C. areas (i.e. sidewalks, cross cutters, handicapped ramps) unless approved by Transportation.
- _____ 7. Show 100-year frequency headwater depth for culverts on sustained grades. Show 100 year and 10 year frequency headwater depth for sag grade.
- _____ 8. Add note on storm drain plan: "When cover to finish grade is 2' or less, class C (420-C-2000) concrete backfill will be required from bottom of pipe to minimum depth over pipe to 4". For Culvers, two-foot cover, minimum is required at hinge point / flow line from top of pavement to top of culvert (keep out of base). If cover is less, concrete saddle per Caltrans Spec Sec 19-3.062 or equal may be required. All pipes maintained by Transportation shall be backfilled per Caltrans spec section 19.
- _____ 9. Specify standard and manufacturer for multi-plate structures.
- _____ 10. Cast-In-Place Pipe may be used for storm drains, however, a letter from the soils engineer recommending the use of CIPP, and noting ground water, expansive soil and trench wall stability will be required. The hydraulic calculations should reflect the correct "n" and structural calculations will be required if the cover over the pipe is less than 3' or greater than shown in table 2.3 per ACI 346. See appendix for the requirements.

_____11. Metal pipe culverts shall be allowed only if per appendix and complying with the following:

	V100 fps	Minimum Gauge	Culverts with Polymeric Invert Coating
Heavy Abrasion	0-4	12 gauge	X
	4-7.5	12 gauge	
	>7.5	not allowed	
Medium Abrasion	0-7.5	14 gauge	X
	7.5-12	12 gauge	
	>12	not allowed	
Low Abrasion	0-10	14 gauge	X
	10-16	12 gauge	
	>16	not allowed	

_____12. Bulking factor may be asked to consider on all culvert designs and per Riverside County Flood Control District requirements. Typically for natural watersheds.

_____13. For all County maintained inlets or outlets that are 10' or greater below the centerline elevation, a 15' paved access road, 15% max grade and 2% cross fall within an easement shall be provided to the inlet and/or the outlet as needed or directed by the Transportation Department. Access road shall be paved within the right-of-way and include a driveway approach with a pipe swing gate, per RCFC standard M820, 20 feet from the curb line. Bollards are not allowed. A 70-foot diameter turn-a-round shall also be provided at the culvert end or equal. Note: Access road is paved over native soil up to headwall.

_____14. Riprap shall be provided at inlets for 1' minimum above the Q100 water surface elevation if it is above the top of the pipe.

_____15. Show rock riprap (1/4 ton minimum, if not grouted) or other erosion control methods. Give required thickness for rock riprap. 30 inches is minimum for 1/4-ton classification.

_____16. A minimum slope of 0.30% shall be provided on all storm drain pipes, and a minimum of 3 fps for 100-year flows shall also be provided. Location of storm drain lines shall be per Standard 817 and a minimum of 24" for main lines with laterals and 18" for laterals.

_____17. When velocity is > 20 fps, the following note should be added on storm drain plans:

"The concrete coating on the inside of all reinforced concrete pipes must be increased to provide a minimum of 1-1/2" over the reinforcing when the design velocities exceed 20 feet per second. The concrete design strength in these reaches shall be f'c = 5,000 psi for velocities exceeding 20 feet per second and f'c = 6,000 psi for velocities exceeding 30 fps."

_____18. Reinforced concrete, pipe anchors are required on slopes steeper than 4:1. Anchors shall be placed at 10' vertical intervals and be constructed per RCFC standard M821.

- ____ 19. A secondary overflow facility to handle the surface Q100 to a basin in a sump shall be provided, such as a ditch, additional catch basin and lateral, routing, or as approved. If a ditch is used, it is not required to be lined, but must convey the Q100 flow when ponding is at the right-of-way elevation. The ditch should drain away from the sump to an acceptable facility, preferably a street. The ditch must be within an easement to allow flows over the property but will be maintained by the property owner. If Transportation agrees to maintain the area a separate lot dedicated to the public with dual fencing should be considered.
- ____ 20. 20 ft. minimum dedicated drainage easement shall be required for all drainage that perpetuates street drainage through private property; and it should be noted as to dedication and on-going maintenance of the surface and shall not be split by existing or proposed lot lines. Drainage easement widths shall be per Easement Table in Appendix. Slopes may encroach up to two feet onto the easement with Transportation permission; otherwise the easement shall be relatively flat and drivable for the length of the easement. Easements may be fenced, however a 16' wide gate in front yard areas and an opening under the fence able to pass the Q100 is required. The property side may be fenced but not the lot side, unless on-going maintenance is set up. If there is a fence across the easement in the back of the lot, a catch basin or opening under the fence able to handle the Q100 safely without impeding the flows shall be provided. The easement should extend a minimum of 10' from the end of County maintenance responsibility.
- ____ 21. If a ditch is used to convey the overflow, a typical section shall be shown, including flow depth, Q and V, and who will maintain the ditch.
- ____ 22. When drainage patterns are substantially changed, drainage is concentrated or increased over historical drainage patterns and Q's, the developer shall obtain either a drainage easement or drainage acceptance letter as applicable. Public storm drains not in road R/W will require easements for pipe maintenance. All public drainage easements shall be per above.
- ____ 23. Give size, length, and "D" strength for reinforced concrete pipe. "D" strength shall be per Caltrans Standard A62D for pipes placed within right-of-way, except for Area Drainage Master Plan Pipes (ADPP) that will be approved by the Flood Control District.
- ____ 24. Show centerline station of catch basin with "W" and "V" on storm drain and street plans. On profile, show F.L. and elevations of local depression of catch basins.
- ____ 25. A manhole shall be provided at the BC or EC of horizontal curves in storm drains for maintenance access and every 400' on straight storm drain line.
- ____ 26. For County maintained box culverts or storm drains, the minimum height of 6 feet may be required for maintenance purposes due to CALOSHA requirements and other heights may be allowed as approved by the Transportation Department. Also, the height to width ratio shall be per Caltrans Standard Plan D80.

- ____ 27. For any unusual drainage facility that Transportation will maintain, a non-refundable cash payment for ten years of maintenance must be calculated and paid to Transportation prior to approval of the improvement plans with a completed agreement. See appendix for agreement.
- ____ 28. For storm drain inlets and outlets (excluding culverts unless warranted or required by Transportation), a grating device shall be used. As a safety consideration, use grating devices whenever the installation is in the vicinity of schools and/or residential area where children and animals might enter the drainage device. Such protection should be in the form of a fence, wall, grate or equivalent.
- ____ 29. Water quality basin. The bottom of the basin should NOT be paved as this would defeat the purpose of the filtration process. The ramp can be paved in all cases. The turnaround can be paved in everything "except" Water Quality Basins, where Aggregate Base Class 3 would be the more appropriate surface. Ramps: 15' wide, 15% max, swing gate (12' from street FL), paved, AC Berm if used for overflow escape or drainage. PCC may be used in place of pavement. Turnarounds: 38' Radius bulb – or- 50'x20' Tee, paved (except AB in Water Quality Basin), max 2% cross slope. Ramps are required where the invert of the inlet/outlet is at least 10' below adjacent street centerline grade. Ramp termination is preferred at approximately the invert elevation, but may terminate at a landing created on top of the headwall (parapet elevation).
- ____ 30. Install man hole on all locations when maintenance jurisdiction changed from County to City or HOA, to differentiate maintenance responsibility. HOA should stay out of right-of-way unless otherwise approved by Transportation Department.
- ____ 31. No flow through catch basin allowed. Connections directly to catch basins are prohibited from off-site sources except for clean water flows.
- ____ 32. For under sidewalk flows Standard 309 with a maximum of 34" opening, Standard 303, maximum width 46". Standard 308 maximum width 36", are all for commercial/industrial drainage. Standard 310 is for single residential lot drainage.

K. FINAL MAP CHECKLIST

The Improvement Plan Checker needs to review the final map for the following:

1. Use correct, updated name for County Surveyor and Clerk Of The Board.
2. Approval date and expiration date of the map.
3. Owners statement dedicates storm drain/access easements, streets, landscapes, etc.
4. Board of Supervisors statement accepts (or does not accept) easements. Typically, if the facility is to be maintained by government, it should be accepted.

5. Easements shown on map should indicate to whom the easement is being dedicated in the statements..

6. Flood Control easements are processed as follows:

Easements dedicated on maps for Flood Control purposes cannot be accepted by the County of Riverside. The County cannot act on behalf of Riverside County Flood Control and Water Conservation District as the County and District are not the same entity.

Easements for RCFC may be dedicated to the Public, and shown as “not accepted” on the Board of Supervisor statement. After construction of the RCFC facility, Flood Control will request Transportation to process an acceptance of the easement, and will quitclaim the public’s interest to Flood Control.

Format of an RCFC easement on a map:

“We hereby dedicate to the PUBLIC an easement over Lot(s) _____ for flood control purposes.”

OR

“We hereby dedicate to the PUBLIC a (n) (_____-foot) (storm drain/flood control/retention basin/access/drainage) easement(s) as shown hereon, for flood control purposes.”

Examples: We hereby dedicate to the PUBLIC, a storm drain easement within Lot 52 and shown hereon, for flood control and maintenance purposes.”

We hereby dedicate to the PUBLIC, a 20-foot drainage easement as shown hereon for flood control and maintenance purposes.”

7. Centerline bearings & distances on final map need to match street plans.

8. Storm drain easements for Transportation need to be shown on one lot, not split on a lot line, and are to be accepted in the maintained road system.

L. CALTRANS RIGHT-OF-WAY PROCESSING

1. Caltrans Right-Of-Way

Some projects involve work within the state right-of-way, which is the jurisdiction of Caltrans. For projects which have conditions of approval (COA) written for the benefit of Caltrans, the county acts as agents for the state in a plan check function. Caltrans, and the County, will review the plans, but Caltrans will not sign or stamp the plans. Instead, Caltrans will issue an encroachment permit number for the work within their jurisdiction.

If there are no Conditions of Approval, the County will review the plans for compliance with Ordinances and Regulations as for a miscellaneous case in addition to the Caltrans review.

2. Plan Review

It is the responsibility of the applicant to submit plans to both the County and Caltrans for review. On the title sheet of the improvement plans, a note must appear showing:

Caltrans Permit Number _____

This number, issued by the state, must appear by the second plan check received by the County.

3. Caltrans Requirements

Prior to plan approval, C.O.A.'s and letters from Caltrans must be satisfied. Any change, deviation, waiver, addition or deletion of a Caltrans requirement must be done in writing with the signature of a Caltrans member authorized to allow the change. Verbal changes will not be honored, nor letters which are missing the Caltrans letterhead and/or signature.

4. Design Standards

Unless specifically required in writing, standards for road widths, drainage devices and the like shall follow the County of Riverside Methods and Standards. All design items in this document shall apply, unless specifically waived by Caltrans in writing. Caltrans will defer to the County for parkway treatments including sidewalk, landscaping and lighting.

Caltrans will review and require pavement sections, curb types and any signs and or striping. If there is a signal involved, it will be reviewed by the maintaining agency.

If the Caltrans standards can not be adhered to for any reason, the applicant shall follow the Design Exception Procedure for obtaining clearance.

M. SLOPE REQUIREMENTS FOR ROAD CONSTRUCTION (WHEN NO GRADING PLAN IS REQ'D)

1. When no grading plan is required, street improvement plans shall show existing contour lines on the plan view with sufficient width to show the entire limits of the grading. In addition, separate cross sections as developed in the design of the road(s) or as may be determined necessary by the Transportation Department shall be submitted. Cut and fill slopes shall conform to the Uniform Building Code (UBC), Chapter 70, Sections 7009 and 7010. When slope heights exceed 30 feet and are steeper than 3:1, the limits of grading, as a minimum, needs to include terraces and interceptor drains as specified in the UBC, Chapter 70, Section 7012.
2. The improvement plans may need to be accompanied by a soil engineering report and an engineering geology report in conformance with UBC Section 7006(d), with their recommendations incorporated. Also to be shown are details of terraces and area drainage with runoff served by each drain, watercourses, and rate of surface runoff for 10 year and 100 year storms (Q10, Q100). The quantities

of grading and drainage structures shall be included on the Transportation Department Construction Cost Worksheet.

3. The faces of cut and fill slopes shall be prepared and maintained to control against erosion. This control may consist of effective planting and other measures. For further information, refer to the latest edition of the UBC, Section 7013.
4. Slopes may be inspected by County inspectors and/or by County contracted inspectors. Professional inspections shall be provided, if required, by the civil engineer, soils engineer and the engineering geologist retained by the permittee.
5. Upon completion of work, final reports are required in conformance with UBC, Section 7015(a) and notification of completion in conformance with Section 7015(b).
6. The National Pollutant Discharge Elimination System (NPDES) is a national program to control non-point source pollutants carried by storm water. The program is implemented and enforced by the State Water Resources Control Board (SWRCB).
7. Notarized letters of permission are required for any grading on property that is beyond tract boundary. See the appendix for grading/drainage letter. Easements may be required in lieu of the above letters if directed by the Transportation Department.

N. GRADING

Grading requests come to Transportation from the engineer/developer/owner.

There are few scenarios of the request and each varies from project to project, or from case to case.

Here are some of the scenarios and how we handle each for (Rough Grading)

1. For any active project that is going thru the plan check process, a request could be made by the design engineer/developer.

In this case the request should/would go directly to the plan check engineer who will look into it and allow or deny grading and if denied then with corrections.

2. For projects which have approved plans and are not active.

(a) Grading plans with a BGR number come to us from the applicant. Many of these involve grading request for one or two lots on an old parcel map.

In this case we review these grading plans and compare them with what we have previously approved and making sure that if any grading is done within the R/W is done properly and providing access to these lots will work today and in the future if that road is designed and built.

- (b) If the grading plan with a BGR number is for previously approved tract, then we compare this new grading plan with the one we previously approved and if all is ok the clearance is issued to Building and Safety.
3. For grading plans with a BGR number which we receive and which we do not have an active project in plan check and/or no improvements plans are submitted yet for plan check, and it seems the engineer/developer would like to jump start; in these cases we deny grading. Improvement plans for the project which has approved conditions must be submitted for plan check; and after doing at least one plan check then the plan check engineer will clear and/or deny grading depending on the findings, and if the finding is not severe, then grading at developer's risk might be issued.
 4. For grading we receive from Building and Safety with a BGR number and which they show some improvements within the road R/W, i.e. driveway construction, under sidewalk drains, adding a sidewalk or any improvements. In this case we review the grading plan and if we find on file previously approved improvement plans, then we will require the engineer to check out our original mylars and revise them to show these proposed improvements before we clear the grading plan for grading, NOTE: For checking our original mylars to do the revision, see Section I - E on revising plans in this handout.
 5. For Plot Plans, Public Use Cases and Conditional Use Cases.
 - (a) If they are active projects in plan check see case 1 above.
 - (b) If they have "IN EFFECT" conditions of approval but nothing is submitted for plan check and we receive a grading request with a BGR number, in this case we review our file for this case and compare the grading plan with the approved site plan on file, and we review the conditions of approval, and if the conditions are written that improvements are required prior to Building permit or prior to final inspection or occupancy then generally we allow on site grading, but no work is allowed in the road right-of-way.

Work within road right-of-way MUST have approved plans and developer MUST get an encroachment permit. NOTE: If no improvements are required but there is some improvements to be done within the road right-of-way such as driveways, drains, laterals etc... Then we will ask the engineer to revise our existing improvement plans if any are available; but if no existing plans are available then we will ask the engineer to give us a mylar copy of this grading plan which is showing the new improvements on it, and we will approve and/or stamp this mylar to allow construction of these improvements within the R/W and the developer MUST show these approved plans to our Permit Section and obtain any encroachment permit to do this work.

6. For (Mass Grading) on large developments, when they come to us with a BGR #, we review them and generally we clear them for Mass Grading if all is OK.

7. We do not review, check or approve Precise Grading as it only deals with grading on the lot. If it affects the right-of-way or causes additional typically work not covered by rough grading then a review by Transportation will be required.
8. For Fire Department Turn-Around, see handout provided by Fire Department.
9. Use permit grading condition: Plan check section will clear grading condition on project level rather than individual BGR cases, to avoid having multiple Grading Permits related to the same use case. By clearing it on the project level case, all future grading permits from that point forward will be treated as already cleared.
10. Work flow for the Ultimate Road Right-of-way follows. This process applies to all grading, dwelling accessory permits, located in the "ultimate road right-of-way."
 - a. Applicant is sent to Land Use to start permit process.
 - b. Land Use Tech checks RCLIS and parcel shows up in Ultimate road right-of-way (URW).
 - c. Land Use Tech informs applicant that proposed construction is in URW.
 - d. Applicant is sent to Transportation Department, no permit number started.
 - e. Transportation makes applicant aware of options and set back requirements.
 - f. Applicant chooses **to comply**. Transportation then places a "notice" on the parcel in LMS and indicates location of URW on site plan and signs off on plan.
 - g. Land Use Tech. checks for Transportation release on site plan, verifies set backs and starts permit.
 - h. Applicant chooses **not to comply**. Transportation then places a, "notice", on the parcel in LMS and sends applicant back to Land Use with letter indicating applicant's choice not to comply.
 - i. Land Use Tech. takes letter, attaches it to the application and starts permit.

O. CASH IN-LIEU OF CONSTRUCTION PROCESSING

1. The plan checker has to agree that your project qualifies to deposit cash in lieu of construction.
2. The engineer prepares the cost estimate for future construction to the satisfaction of the plan checker.
3. The plan checker approves the cost estimate.
4. The Plan Check Supervisor approves the agreement already signed by the developer.
5. The agreement and check are processed beginning on the 8th floor.
6. Standard notation is then inked on the mylar of the street plans and they can be signed. An amount of \$ (dollars) has been placed into account #20000-3130100000-230106 for the future

construction of (facility type) located on (street name or location) which is not feasible to build at this time. Receipt Number _____ dated _____.

7. On landscaping plans, there must appear a note on the title sheet regarding the area of the future landscaping. "Future median landscape area = _____ SF." This allows for calculation of future landscape maintenance money by the agency of jurisdiction. See Comprehensive Landscape Guidelines for more information.