MEMORANDUM

Texas Department of Transportation

TO: District Engineers **DATE:** February 12, 2009

FROM: John A. Barton, P.E. John A. Barton P.E.

SUBJECT: Cost Control Ideas Update

As stewards of public funds, we are expected to maintain cost effective programs and to design our projects in a cost effective manner. With the potential of a federal economic stimulus program and the recent discussions on projected tax revenue shortfalls, it is a good time to revisit Mr. Saenz' memorandum of February 26, 2007. The memorandum provided a list of ideas for cost savings measures districts were to consider.

Attached is a revised spreadsheet edited to reflect the most current guidance on these practices from the Administration. In addition, Research Project 6011, *Evaluation of Ways and Procedures to Reduce Construction Cost and Increase Competition,* was recently completed and the corresponding Project Summary Report (PSR) and detailed report have been published. The detailed report is available on the Center for Transportation Research Library report link at http://library.ctr.utexas.edu/pdf02/6011-1.pdf. The PSR is available at http://crossroads/org/rti/PSRs/6011%20final.pdf. We have attached an abbreviated listing of ideas to consider from the research project.

Again, we are asking that each district consider implementing the ideas suggested into your planning and execution of your work programs. Implementing these ideas will go a long way toward keeping Texas' transportation system the best in the nation.

Attachments:
Cost Control Summary Responses
Summary Listing of Ideas from Research Project 6011

cc: Thomas R. Bohuslav, P.E., Director, Construction Division
Mark A. Marek, P.E., Director, Design Division
Carlos A. Lopez, P.E., Director, Traffic Operations Division
Toribio Garza, Jr., P.E., Interim Director, Maintenance Division
David P. Hohmann, P.E., Director, Bridge Division
Rick Collins, P.E., Director, Research and Technology Implementation
District Directors of Construction
District Directors of Maintenance
District Directors of Traffic Operations
District Directors of Transportation Operations

Highway Construction and Maintenance Cost Control Ideas

This is a partial update to the February 26, 2007 Saenz transmittal.

Maintenance (Pavements)

Idea	Potential Cost Savings	Implementation	2009 Updated Response
1. For preventive maintenance, seal of rural roadways with less than 5000 ADT and strongly consider sealing roadways with over 5000 ADT.	Savings would be the difference between seal coat and ACP unit prices per square yard.	Districts are to apply the proposal in their district and use engineering judgment to justify other treatments.	Most districts have implemented or will implement. Thresholds being used are 5000 to 45000 ADT.
2. Don't seal shoulders every cycle.	We currently maintain 446,898,768 SY of flexible pavement shoulders. Cost savings potential could be as high as $50,000,000 a year.	Recommended practice for districts.	Most districts have implemented or will implement. Some stated that where they have significant cracking on the shoulders, they will probably seal.
3. Use spot levelup with seals.	Assuming 10% of the lane miles overlaid were low volume, savings could be as high as $22,000,000 a year.	While patching is still a component of the full PMIS, reports are run to without patching to determine efforts to stretch dollars and address pavement conditions Districts are encouraged to use strip and spot seals and levelups to the extent needed.	Districts stated they have implemented or will implement. Again, patching is still included in PMIS distress and condition total scores but reports can be run without the patching utility to evaluate how districts are stretching dollars.
4. Spot and strip seal main lanes and shoulders.	In FY 2006, we seal coated 22,217 LM where 781 LM of that was spot and strip. Assuming that if you use spot and strip seal (30 percent of the lane width) for 10 percent of the roads that you would normally seal full width, the potential savings could be as high as $17,500,000 a year.		Most districts stated this is a current practice and may expand its use. Considerations are made for differential skid.
5. Use rut boxes and scratch microsurface passes to address rutting in the wheel path.	In FY 2006, we overlaid 6304 lane miles. Assuming that we micro 10 percent of the lane miles normally overlaid and 30 percent of the Lane is in wheel paths, the potential savings is $12,000,000 a year.	Recommended practice for districts. Use the most cost effective treatment.	Most districts stated they have implemented or will implement. Some concern over long term performance of microsurface, as microsurface is not a good candidate for distressed pavements. Two districts stated they will address rutting with thin ACP as it can be more cost effective to use thin ACP.

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Idea	Potential Cost Savings	Implementation	2009 Updated Response
6. Use fog seals on main lanes and shoulders.	In FY 2006, we seal coated 22,217 lane miles and assuming that we fog sealed 5 percent of these SY in lieu of Seal coat, the potential savings is $12,000,000 a year.	Recommended practice for districts.	Districts state they have implemented or will implement. Some stated they use to reduce oxidation, raveling, and for shoulders and low volume roads. An East Texas district stated they do not have success due to high humidity.
7. Engineer the seal coat. Select the appropriate asphalt aggregate and precoat requirements. Consider reduced requirements for underseals and shoulders. **a.** Select the appropriate asphalt grade for the application and for competition. **b.** Select aggregate for underseal understanding need for grade and SAC. **c.** Select appropriate material for precoat or whether to precoat. Precoat may be needed for hot applied asphalt but not needed for Emulsions.	*See following spreadsheet showing cost per SY for different asphalts and seals.* Aggregate manufacturers state that allowing emulsion precoating can save up to $6 a CY of aggregate. Higher binder grades are generally not necessary for underseals. Surface Classification does not apply to underseals. Grade 5 aggregates have been shown to be effective aggregates for seal coats on shoulders and on lower volume roadways with smooth surfaces.	Districts are directed to evaluate their programs to look for potential efficiencies. See John Barton memorandum of June 13, 2008 http://crossroads/org/cst/docs/pendingupdates/Memo%20-%20sbs_asphsupply.pdf and supplemental memorandum of June 26, 2008. http://crossroads/org/cst/docs/pendingupdates/Memo%20-%20SBS%20Asphalt%20Supply.pdf	Most districts state they will or will consider these recommendations in their program. Some state they set up alternates in the bid. One district had comments relating to one size aggregates being cost effective from plants that are fractionated while at other plants, it is not efficient and the use of Gr. 5 aggregate saves on pit reserves. Another district stated they are considering using Gr. 5 on shoulders. Districts presented numerous ideas on strategies for implementation. BWD includes a true alternative of AC with PB rock and emulsion with B rock. BWD found the emulsion was the low alternate 14% under the estimate. See asphalt guidance document for help in selecting asphalt for specific uses and conditions. ftp://ftp.dot.state.tx.us/pub/txdot-info/cst/AsphaltMaterialsandUses.pdf

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Typical Materials and Costs (2007)
Item 316 Cost per Square Yard

Aggregate	Binder					
	AC-20-5TR	AC-15P	AC-20XP	CHFRS-2P	CRS-2P	AC-10
P 3S SAC-B	$1.94	$1.84	$1.83	$2.23	$2.17	$1.76
3S SAC-B	$1.77	$1.68	$1.67	$2.07	$2.00	$1.59
3 SAC-A	$1.57	$1.47	$1.47	$1.72	$1.67	$1.41
3 SAC-B	$1.50	$1.41	$1.40	$1.65	$1.60	$1.35
4 SAC-A	$1.47	$1.37	$1.36	$1.55	$1.51	$1.32
4 SAC-B	$1.14	$1.04	$1.04	$1.22	$1.19	$0.99
5 SAC-B	$0.89	$0.80	$0.79	$0.89	$0.87	$0.76

Assumptions:
1. Same road conditions.
2. Emulsion allows 10% reduction in percent residue.
3. AC-20-5TR requires a slightly higher application rate.
4. Yellow highlight shows for precoat versus non-precoat for Grade 3S case.
5. Not shown here is that when binders are bid with alternates, the prices are generally lower.

Pavement Design and Alternates for Pavement Design

Idea	Potential Cost Savings	Implementation	District/Division Response
8. Consider alternative designs.	Refer to Thomas R. Bohuslav's memorandum of December 2, 2004.	Districts are directed to evaluate programs for potential efficiencies.	Most districts stated they have implemented and consider on a case by case basis.
a. Ultra Thin Bonded Wearing Course (Novachip) versus an underseal with PFC, all with lane rental.	**a.** Districts noted from contractor comments that even though the UTBWC was low when applying lane rental, prices for both dropped.		
b. Hot in Place Recycling (HIR) with virgin material overlay in same pass (Cutler) versus Dustrol followed by an overlay versus mill and overlay with 30 percent RAP, all with lane rental.	**b.** Creates competition for the one pass (Cutler) process.	**b.** New specifications for HIR have been developed that establish greater performance reliability.	
c. Thin Bonded PFC versus an underseal with PFC, all with lane rental.	**c.** Creates competition.		
d. Reflective Crack Relief Interlayer (Strata) versus rich bottom layer.	**d.** Creates competition.		
e. Concrete pavement versus flexible pavement.	**e.** Bell County project included concrete pavement alternate. Low bid was $81 M. Projected savings	**e.** Guidance for concrete versus flexible pavement design has been	

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	of concrete pavement over flexible was $11 to $16 M without applying discounts for future overlays.	provided. See Barton memo of October 22, 2008. http://crossroads/org/cst/docs/pendingupdates/altpavdesgn_barton102208.pdf	Most districts stated they have implemented and consider on a case by case basis.
f. Look at alternative pavement designs such as lime, lime-fly ash, cement, ASB, emulsion stabilizations and combinations thereof.	**f.** Will increase competition. Alternative structurally equivalent pavement designs were generated (FPS-19W) using virgin materials for a moderate level of traffic (assumed traffic was 5,000,000 ESALs). Relative costs per lane mile to construct (disregarding mobilization). Does not consider maintenance cost. What is shown below is an example of cost analysis for alternative pavement designs: *HMA-Cmt Stab Base-Lime Treated Subgrade*: $356,800. Relative cost = 1.00 *HMA-Lime Stab Base-Lime Treated Subgrade*: $518,200. Relative cost = 1.45 *HMA-Lime-FA Stab Base-Lime Treated Subgrade*: $505,000. Relative cost = 1.42 HMA-ASB-Lime Treated Subgrade: $411,100. Relative cost = 1.15 *HMA-ASB-Flex Base-Lime Treated Subgrade*: $423,400. Relative cost = 1.19	Districts are directed to evaluate programs for potential efficiencies.	
g. Recycling pavement versus virgin design to restore surfaces.	**g.** For an existing highway requiring rehabilitation using full-depth rehabilitation (pulverizing existing structure, cement treating reclaimed surface/base to 12-in, resurfacing with HMA), relative cost per lane mile to reconstruct is: HMA-Cmt Stab Base-no Subgrade Treatment: $ 281,500. Relative cost = 0.79 For an existing deep HMA	**g.** Additional guidance and specifications have been developed that required and encourage the use of RAP.	

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	structure requiring rehabilitation by milling 4" of mix and resurfacing with a structural HMA overlay: HMA-existing HMA-no subgrade treatment: $304,600. Relative cost = 0.85.		Most districts stated they have implemented and consider on a case by case basis.
h. Set up Type A flex base with an alternate Type B with lime.	**h.** Yoakum district has seen some projects save as much as 22% over Type A.		
9. Use RAP and crushed concrete for construction.		Districts are directed to evaluate programs for potential efficiencies.	Districts stated they use as best they can or they have implemented or will implement. Some discussion on application location, experiences, and strategies for use. One district uses 100% CSB RAP under concrete pavement and has had success. Comments that it is best to use these recycled materials on the original project where it was generated.
a. Blend up to 50% RAP with virgin materials for driveways, crossovers, other miscellaneous areas, shoulders, for underlying layers, and for bond breaker for rejuvenated RAP and RAP blended in ACP.	**a.** Blended with virgin material can save up to $6 per ton of mix.		
b. Use RAP in base.	**b.** For shoulders, $15 a CY rejuvenated RAP versus $60 per ton for virgin ACP.		
c. Allow for the use of crushed concrete for flex base.	**c.** For a large urban district, this could save as much as $1.5M per year.		
10. Consider alternatives to 4 inch ACP as bond breaker under concrete pavement. Rigid Pavement Design allows 3 possible layer combinations (bond breaker and non-erodable material) which could be bid as alternatives **a.** 4 in. of ACP **b.** 4 in. of ASB **c.** 1 in. ASB over 6 in. of CSB	Creates competition. There is a research project to address other alternatives.	Recommended practice for districts.	There is ongoing research to look at additional options.
11. Engineer ride and schedule application. Know		Recommended practice for districts.	Districts stated they are doing this. Guidance

Idea	Potential Cost Savings	Implementation	District/Division Response
existing ride for overlays.			provided at ftp://ftp.dot.state.tx.us/pub/txdot-info/des/specs/ridequal.pdf Districts are adding to their PS&E Checklist.
12. Consider flex base with 2 course surface treatment (CST) as an option to flex base with ACP.	Traffic Assumptions: ADT 1500, 20-year 2300 - Growth rate of ~2.2%. Cumulative 20 year ESALs is 1.1 M *Strong subgrade (West Texas shallow bedrock)* cost/lane mile 2" HMA-8" flex base: $197,120 2 CST-12" flex base: $171,380 relative cost ratio: 0.87 *Weak subgrade (East Texas, deep bedrock)* 2" HMA-12" flex base + 6.0" lime treated subgrade: $280,880 2 CST 15" base + 6.0" lime treated subgrade $243,400 relative cost ratio: 0.87 The assumption above for the weak subgrade scenario also assumes a Grade 1 Type A flex base. If more typical locally available flex base were used the figures for the weak subgrade region would change as follows: 4" HMA-12" flex base + 6.0" lime treated subgrade: $384,130 2 CST 18" base + 6.0" lime treated subgrade $278,600 relative cost ratio: 0.73	Districts should strongly consider flexible base with 2 CST design for rural facilities with less than 2000 ADT. Considerations above 2000 ADT are encouraged.	Current procedures with FPS use a modulus of 250ksi and thickness of 0.5 inches for a 2-Course ST. Use of other model inputs may require research to validate projected performance. Districts stated they will consider. Some statements that they will consider for detour, rural, low volume roadways. Specific guidelines and matrices, including traffic volumes, were presented by two districts for implementation.
13. Apply 60 and 70 degree pavement temperature restrictions for ACP placement using good judgment.		Districts should educate their inspectors on district practices for applying the specification and consider all factors identified in the Construction Technical Quarterly. Districts should	Districts have implemented. Districts stated they have developed general notes using the Technical Advisory, ftp://ftp.dot.state.tx.us/pub/txdot-info/cmd/tech/ta081706.pdf

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		develop general notes necessary for applying the requirement in their district.	made a topic on the pre-paving meeting, and instructed their inspectors on appropriate actions.

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Alternative Materials, Material Allowances, and Requirements

Idea	Potential Cost Savings	Implementation	District/Division Response
14. Reuse MBGF rail that is determined to be in good condition.	Assuming districts do not reuse any (some do) and assuming that approximately 30 percent of it is reusable the potential savings could be $2,000,000 a year.	Recommended practice for districts.	Districts stated they have implemented in maintenance and construction. MNT and districts state this is used for rail repair work.
15. SGT on off-system bridges.	TxDOT replaced 151off-system bridges last FY. SGT's averaged $1,997 and turn downs averaged $371. This would have been a net savings of $1,000,000 statewide.	There has been no change in the FHWA position with respect to the use of crash tested systems on off-system bridges.	
16. Reconsider requirements for certification for concrete plants and trucks, including structural concrete.	This cost is $1000-$2000 for plants and $1000 to $7000 for trucks per year. Added cost would be due to a plant or truck requiring repair in order to pass the inspection. New special provision 421-024 now allows the Engineer to waive the certification requirement for non-structural concrete and non-bridge class culverts.	Current special provision is optional to districts for non-structural and non-bridge class culvert concrete. Districts may submit to the Specification Committee a special provision for structural concrete plant inspection by the department, beyond the 421-042.	Some districts will consider waiver and department inspection, on a case by case or district basis. Some districts state plants in their area are currently certified and they do not plan on waiving the requirement. One district stated that they plan to inspect the plants before the lettings to make them aware of what is needed in order to supply materials (waiver and department inspection).
17. Proper requirements for PG binder. **a.** Reduce use of restrictive specification requirements. **b.** Specify higher grade PG binder only when needed.	**a.** Item 341 Type-C SAC-A, PG 76-22 vs PG 76-22S: 12 mo. Moving avg. $68.45 vs $72.54/ton - $4/ton diff. Item 341 Type-C SAC-B, PG 70-22 vs PG 70-22S: 12 mo. Moving avg. 63.91 vs 74.99/ton - $11/ton diff. Item 341 Type-C SAC-B, PG 76-22 vs PG 76-22S: 12 mo. Moving avg. 68.22 vs 80.14/ton - $12/ton diff. **b.** PG 70-22 is polymer modified where PG 64-22 is not. Item 340 Type A w/ PG70-22 = $85/ton versus w/ PG 64-22 = $72/ton -- $13/ton diff.	Guidance has been developed for mixes and asphalt selection for the conditions. Districts are to reduce non-competitive requirements and apply PG grading requirements with a statewide perspective. See John Barton memorandum of June 13 and June 26, 2008.	Districts stated they have implemented or will implement. Some districts stated they do not specify modifiers. Some districts stated the AE determines if the grade and if the type of modifier need to be specified. Guidance for PG binder selection at: ftp://ftp.dot.state.tx.us/pub/txdot-info/cst/PGSelectionProcess.pdf Mixture selection guide ftp://ftp.dot.state.tx.us/pub/txdot-info/des/specs/flexpave.pdf

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Idea	Potential Cost Savings	Implementation	District/Division Response
18. Provide for alternative materials and construction methods in PS&E. For certain materials, haul limits the competition severely and the more options you can give, the better prices we can get from a contractor. **a.** Provide AEP, PCE, EAP&T as an option to MC-30 **b.** Use emulsions as alternatives for prime coat. (Item 310 versus Item 314 and CSS-1 and SS-1.) **c.** Alternative binders for seal coat. **d.** Concrete pipe and plastic pipe alternates. **e.** Hardie pipe alternates to concrete pipe. Hardie pipe is no longer available.	**a.** AEP example 12mo. Moving avg. Item 310 MC-30=$2.86 and AEP=$1.92; PCE= $1.5/gal. Application rates are approximately the same as MC-30. This provides options, especially when the materials are not readily available. **b.** For Item 314 (alternate to 310) MS – 2 OR AEP is $2.25. For the same residual, will require higher application rate for the emulsion but creates options for bidders that will increase competition for the MC-30 product. **c.** For most applications, alternatives can be bid against each other to create more competition. **d.** Creates competition. **e.** Creates competition. From the statewide 12 month average low bid unit price for all concrete pipe, 1,056,551 LF of pipe was bid for a total price of $ 78,899,019. If an alternative pipe is used at 70% savings, the potential savings could be $23,699,706 a year.	Recommended practice for districts. **d.** See Barton e-mail of December 2, 2008 on thermoplastic pipe.	Districts stated they have implemented or will implement some aspect of this recommendation. Districts stated they are considering allowing alternatives for prime and seal coat binders. Some discussions on past experiences. Some districts considering or already using Hardie pipe. Use of plastic pipe has been encouraged.
19. Allow for Class 5 or Class 8 for concrete joint seal. Used for joint sealer for concrete pavement or bridge joint sealant.	Allowing Class 5 or 8 increases the number of material sources and results in more competition. That for similar size projects specifying Class 8 cost $1.63/lf and Class 5 cost $2.25/lf.	Districts are to allow for both materials.	Districts stated they comply with current specifications. One district stated that they restrict the option further when traffic opening requires quicker cure.

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Structures and Structure Aesthetics

Idea	Potential Cost Savings	Implementation	District/Division Response
20. Aesthetics Bridges **a.** Example of steel traps versus I-beams. **b.** Minimize wall panel unique designs. **c.** Ask locals to participate in the aesthetic cost. **d.** Standardize design and repetition. In regard to repetition, address competition. **e.** Address consultant designs not in agreement with TxDOT standards or practice. **f.** Reduce painted concrete.	**a.** Could have saved $1 M on one project and traps would have required fracture critical BRINSAP inspections. **b.** In some cases, it can add $6000 per panel. Cost can go up $6.50 SF. **f.** While initial cost is low, around $0.25 per SF, maintenance costs are high. Hartman bridge initial paint was $20,000 and a repaint has been let for $800,000, requires removal of existing paint and total cost is $3 to $5 per SF.	Districts are directed to evaluate programs for potential efficiencies. This is not to detract from required programs such as the Green Ribbon Program.	BRG Division is monitoring projects that are under development for unusual/excessive aesthetic requirements. BRG supports the use of details that are known to result in low costs. Nationwide, our bridge costs are at or near the lowest. Districts stated they do their best to manage added cost for aesthetics, including asking for local participation. Districts stated they will take advantage of repetition and will make contractors aware of where they plan to use special forms for future projects. Examples presented on the Green Ribbon program to standardize aesthetics. District presented strategies for using dyed concrete to reduce maintenance cost.
21. Design foundations to the appropriate depth.	Several cases where foundations have been designed to a depth exceeding requirements. One case where there was 144 feet of excessive drilled shaft at an extra cost of $24,768. There have also been cases where a design penetrates well beyond the 3 (surface) and 1 (at depth) diameter into rock. One case of 80 feet of excessive penetration at an extra cost of $22,000.	Districts are directed to evaluate programs for potential efficiencies.	Districts stated they agree and have no problems. Suggestion that consultant plans should be reviewed by qualified geotechnical design staff.

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Roadside Maintenance and Landscaping

Idea	Potential Cost Savings	Implementation	District/Division Response
22. Reduce intensive landscape that requires high maintenance, hand mowing, bed maintenance. Execute agreements with locals to perform maintenance. Let landscape along a corridor.	TxDOT spends approximately $5M/year for landscape maintenance, increasing approximately $500,000 per year. If no additional intensive landscape maintenance were installed or if agreements were made with cities, counties or associations (Garden clubs, etc) to maintain those areas, potential savings would be $500,000/yr.	Recommended practice for districts. Districts should coordinate work so that only necessary landscaping is included in the plans and further consider letting landscape along corridors after construction is complete.	Districts stated they have been or plan to ask locals to participate in landscape, including maintenance. Some statements that the locals criticize the district in that they refer to other areas of the state where higher intensity landscape has been provided. One district stated they plan on requiring the locals fund 50% of the landscape initial cost and that the locals be responsible for maintenance. District stated that Inmate labor is being used or use is being considered. Districts stated they use plants that are low maintenance and have low water needs.
23. Mowing start dates need to be more flexible. Do in a way that encourages competition.	From analyzing some comparable districts that are flexible with start work dates to districts that require all contractors to start on the same date, a cost savings of $4.78 per acre was observed. There are only 2 districts that require all contractors to start on the same day. These districts could save a total of about $550,000 per year by staggering starting dates.	Districts are directed to evaluate programs for potential efficiencies.	Districts stated they have implemented this or a similar program and will evaluate further. Districts stated that they are already flexible by coordinating with their contractors and maintenance offices and manage best to address safety and wildflowers. Some state they do not see elevated prices due to time requirements.
24. Maintenance related. Mowing when not needed. Mowing 8 inch grass to 4 inches.	In FY 2006, we mowed 1,779,595 acres at $26.80 per AC. Assuming that 10 percent of those acres did not need mowing then we could have potentially saved $4,769,315.	Districts are directed to evaluate programs for potential efficiencies.	Districts state they only mow when needed. Districts states they have or plan to set up less cycles and add cycles if they need it after letting or make use of spot mowing or add optional cycles to be used for wet years.

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25. Increase use of prison labor. Contract with prisons to clean, repaint, service equipment, etc.	The Lubbock District spent an average of $17,000 for oil change and car wash services during the last two fiscal years. Since the Lubbock District has one of the largest fleets, the average district expense will be less than that. If the average district expense is estimated at $12,000 per year, and 50% of the districts were able to utilize prison facilities for these services, we could potentially save $150,000 per year.	Districts are to work with MNT to execute agreements with TDJC for prison labor. (Not all prisons have access to the facilities and equipment necessary to perform all these tasks. Even when a location has a prison which is capable and equipped to perform the work, it is not always reliable, from a time standpoint, due to prison requirements, lock downs, etc. TDCJ needs to have a standard approach to these agreements across the state. The use of prison labor could affect State use contracts in various parts of the state.)	MNT states prison labor can be used for maintenance of equipment including cleaning of salt and sand cleanup. MNT is working on new contracts for prison labor. Several districts stated they use prison labor with some and limited success. Works is focused on labor intensive type work. Some comments that the department competes with locals in that the cities and counties who provide lunches and transportation for inmates. Some comments on coordinating with TIBH. Comments on the lack of interest by wardens. Some statements that the participation has diminished due to restrictions from the prisons (suggesting need for top level commitments from TDCJ).

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Markings

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26. Reduce RPM spacing to 80 foot everywhere. It is further proposed that routine placements not exceed the standard.	If RPM spacing was 80 foot everywhere, there could be a possible cost savings of $134 per mile.	TRF is to evaluate implementation of 80 foot spacing. (TxDOT's current policy requires 40 foot spacing on no passing zones. The 40 foot spacing increases the safety in those areas which generally have limited sight distance. TRF believes that it would be more prudent to enforce 80 foot spacing on frontage roads and those roads which exceed the minimum standard of 80 foot spacing. There are issues where 40 foot spacing is used for all locations, beyond the requirements in the standard.)	The standard will not be changed to remove the 40 foot spacing for no-passing zones, limited sight distance, narrow bridges, and safety issues for Type II-C markers on two-way roads. For Type 1-C and Type II-C-R markers, TRF will update the standard sheets with a new note that requires 80 spacing for all locations. Idea has been fully implemented.
27. Use the latest formulation of water base paint to stripe previous year seal coat.	The latest formulation of water base paint will last about double or triple of regular water base and is cheaper than thermo.	Districts are directed to evaluate programs for potential efficiencies.	Some districts state this is their current district policy, they are evaluating, or they plan on implementation while others state that water base doesn't dry fast enough, requires twice as much striping, or is generally not cost effective. Several districts use water base after seals and follow up with thermoplastic the following year.
28. Reconsider use of in-house striping.	Many areas in West Texas have few local striping contractors and pay a higher price to have contractors mobilize to those districts to perform striping. Cost increases ranging from $500,000 up to $4,000,000 annually have been reported.	Current Administrations' direction is use the most cost effective means.	

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Competition

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30. Use delayed time start and flexible start date provisions. Allows smaller contractors to bid and adds efficiency opportunities.	Reduced contractor overhead and increased competition.	Districts are to implement whenever possible.	Districts stated they will evaluate, have implemented, or will implement.
31. Give more time for Contractor's plan review prior to letting. **a.** Web site with preliminary plans. More than one month. 6 to 8 weeks. Stamped with EPA requirements if needed, on Web. **b.** Consider release proposal and plans 2 weeks earlier.		DES to further address procedures with Administration for earlier release of preliminary plans. Districts currently have procedures for release of preliminary plans (See Amadeo Saenz' memo dated January 4, 2002 and Ken Bohuslav's memo dated June 11, 2002.)	Districts stated they have implemented or will implement.
32. Create an "open for business" air. **a.** Call contractors on release date to encourage bidders. **b.** Call contractors after the letting to determine why they didn't bid. **c.** Discuss plans and proposal with contractors to determine if there are issues with the contract that create difficulties or barriers to bidding. **d.** Issue addenda as needed. **e.** Welcome bidders in showing jobs. Be available for showing jobs. **f.** For unique work, such as special forms, discuss future projects.		Recommended practice for districts.	Districts stated they have implemented, will evaluate, or will implement many of the items listed. Some districts stated they use these ideas on unique or complicated projects.

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Idea	Potential Cost Savings	Implementation	District/Division Response
33. Consider waiving prequalification on construction projects. (Waiver of prequalification is the default for construction projects less than $300,000 and all RMCs.)	Prequalification cost a contractor at least $2,000 to $50,000. A compiled or reviewed financial statement (Bidders Questionnaire) is as little as a few hundred dollars. In addition, waiving the prequalification creates increased competition.	Districts are directed to evaluate programs for potential efficiencies.	Districts state they use when appropriate. To clarify, this is a district decision and is submitted through DES. Some negative experiences from non-prequalified contractors when waivers were included in the letting. District commented that they waive for landscape projects where there is no work on the roadway.
34. Reconsider implementation of Value Engineering (VE) for the construction phase.		Administration has stated that while we should be open to contractor proposed changes, we do not currently have or propose to have a VE cost sharing special provision or cost sharing policy.	Administration stated that contractor proposed changes should be negotiated such that prices allow for a reasonable risk and profit.
35. Use additive and deductive alternates. Must award on base bid or predetermined budget amount.	Helps getting a project awarded and staying on budget. Especially when we have third party funding.	Districts should consider for the type of projects addressed under "Response."	The department will consider the use of additive or deductive alternates for projects where third party funding, budget, and components are integral to the award. Until further notice, additive or deductive alternates will not be allowed for department let projects. Department letting systems have been revised to allow for use of additive and deductive alternates for special cases.

Highway Construction and Maintenance Cost Control Ideas

This is a partial update to the February 26, 2007 Saenz transmittal.

Idea	Potential Cost Savings	Implementation	District/Division Response
36. Reduce contract duration and scope, so risk is less. Even though long term may reduce cost. In some cases, with highly volatile items and resources, contractors have to put in more risk.	Although there is potential cost savings, there are frequently lower costs for longer term contracts because contractors can amortize equipment over a longer period of time. Volatile pricing situations, like we are in now, cause prices to escalate in longer term contracts because contractors are bidding in unknowns. We anticipate these will cancel each other out.	Districts are directed to evaluate programs for potential efficiencies.	Districts stated they will evaluate and consider on a case by case basis.
37. Consider project size to increase competition. **a.** Economy of scale, bundling or splitting projects. **b.** Area contractor capacity. **c.** Consider material source influences on competition. **d.** Consider subcontractor cost when bundling so odd work is not included.	In a previous review competition, generally across the state we saw an average number of bidders as follows: Less than $10 M – 3 bids. $10 M to 150 M – 5 bids. Greater than $150 M – 1.5 bids.	Districts are directed to evaluate programs for potential efficiencies.	Districts stated they will evaluate and consider on a case by case basis. Recent lettings show good competition for all types of projects, averaging more than 6 bidders, except for specialty type work such as landscape.
38. Provide state yard and plant locations on-ROW or lease space off-ROW. Consider acquisition of yard sites for TxDOT that contractors could use for construction yards, etc.		Strongly recommended practice for districts.	Districts stated they have implemented and work with their contractors to address on a request basis. One districts state they lease off ROW sites and include plan information for on-ROW and off-ROW sites. One districts purchases land locked or remainders parcels for contractor yard and state stockpile use.
39. Update estimates. Use addendum to address barriers to bidding.		Recommended practice for districts.	Districts state they update their estimates. Several districts state they update their estimates one month prior to letting.

Highway Construction and Maintenance Cost Control Ideas

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Idea	Potential Cost Savings	Implementation	District/Division Response
40. Quality of plans and information needed by contractors including available materials, yard, water, and base sources. Include photographs.	Contractors bid on projects with the best information available. If substantial field investigation is necessary or the contract is unclear about some provisions, the contractors bid higher to cover their cost of bidding on the project and manage their risk. Reducing the contractor's risk by improving the quality of information available in the plans would definitely save money. Construction and Maintenance Contracts amounted to $5.6B in FY 2006. Assuming improved plans would result in a ½ % reduction in bid prices, annual savings would be $26,500,000		MNT and districts state they will consider the use of photographs on plans and provide videos on future projects. Some concern expressed that media quality of plans is insufficient for photographs. One district requires a certification of the accuracy of plans from consultants. One district is refining their plan review process. Some districts provide additional information of sources but do not make it contractual. Some districts provide willing landowner listings for borrow, water, yards, base, etc. to contractors prior to bids.
41. Consider appropriate time for project completion.		Districts are to use good engineering judgment for establishing practices.	Districts state they consider appropriate time. Some use good judgment for time through CPM analysis. Districts state they adjust for local conditions.
42. Evaluate restrictive work hours and the effect of time to set up traffic control on production for daily operations.		For further district consideration.	Most districts don't use restrictive work hours and those that do, do on a case by case basis. Statements made that certain roadways only allow for restrictive work hours due to traffic volumes. Districts that use restrictive work hours account for lost production in their time for completion for the project.

Highway Construction and Maintenance Cost Control Ideas

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Project Scope

Idea	Potential Cost Savings	Implementation	District/Division Response
43. Appropriate Design for Projected Capacity **a.** Ensure that divided 4 lanes are being built that design year capacity justifies added lanes or divided facility. Designs can be phased in over time. This may address several rural connectivity projects.	**a.** Use of super 2 lane can save an estimated $50 M on a 25 mile project versus of the cost of a divided 4 lane project. Recommended as an interim condition for roadways of less than 5,000 ADT and staggered passing lanes (not simultaneous as this could possibly eliminate future funding for trunk system criteria).	Districts may wish to discuss with Administration reduced scope and phased construction. Administration to consider further.	Some districts state they feel they have made a commitment to complete trunk system projects to the previous standards. Some state they will consider for future projects. Some districts stated they have already been using super two lane.
44. Use minimums versus desirable when safety or the future improvements to the transportations system is not compromised.		This is an engineering decision that needs to be made based on each project. No policy is needed to change; it is at the discretion of the district now.	Districts state they will continue to use good engineering judgment.

Other

Idea	Potential Cost Savings	Implementation	District/Division Response
45. Use HES funding to offset the cost of Rehabilitation projects either through scheduling sequential projects like some other states or through the combination of funding.	This would allow simple credit for safety work in rehabilitation projects.	Does not require a revision to policy, as this is currently allowed and encouraged to get economy of scale. However, the safety work will still require index justification.	See "Implementation" to the left. Districts state they try to do this as much as possible.

Highway Construction and Maintenance Cost Control Ideas

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Idea	Potential Cost Savings	Implementation	District/Division Response
46. Return to the use of more 2R (Restoration) projects.	Will reduce the scope of projects.	Criterion is currently 3000 ADT for use of federal funds. Its intent was to ensure TxDOT would improve the system when we are doing major pavement repair. ADT was previously increased from 1500 ADT to 3000 ADT. Discussions with FHWA are ongoing for raising the ADT for the use of 2R criteria.	A change to criterion is currently being discussed with FHWA.
47. Need district carryover for 105 and 144 each year. Will allow a district to manage their work so they are not forced to let work or buy materials they don't necessarily need.	In strategy 105, no direct cost savings could be identified, however, this could possibly help to make the districts more efficient in their use of their budgets. In strategy 144, the districts already have this ability.	TxDOT already has the ability to carry unused Strategy 144 funds forward into the next fiscal year. Carryover of Strategy 105 funds would require changes in legislation.	Administration will consider for 105 statute changes legislative sessions.
48. Eliminate individual transfer fees for NOIs, etc and do one for the entire state.	Administrative savings not quantified but recognized.	ENV to address further. Would require an agreement with TCEQ and a method to determine statewide fees.	ENV has been unsuccessful in consolidating the billing with state agencies. However, processes to streamline the payments for individual projects have been developed.
49. Consider elimination of subsidiary work that is essential to the bid item.		Districts should evaluate subsidiary work to ensure the value does not overwhelm the cost of the work or create undue risk on the contractor.	Districts state they take this into account in their PS&E development.

Research Project 0-6011 Evaluation of Ways and Procedures to Reduce Construction Costs and Increase Competition

Top Ranking Cost Reduction Methods.

Rank	Method	Comments
1	Take time to develop sound designs using appropriate design criteria and technical information. Incorporate pavement evaluation, geotechnical, and utility data in designs.	Make it a practice to provide thorough designs.
2	Provide alternative materials in PS&E.	Consistent with past recommendations from Administration.
3	Standardize designs and provide more design repetition.	This recommendation is primarily aimed at form liners and fabricated products.
4	Educate and train designers, consultants, and contractors.	Incorporate design policies in consultant requirements.
5	Coordinate lettings based on the availability and capacity of contractors in the region.	Know your contractor base for competition.
6	Better define and optimize the project scope initially and subsequently control scope creep by accountable authority.	Policies have been implemented to account for cost growth.
7	Minimize detours and diversions.	
8	Evaluate alternate contracting methods including design-build (DB) and construction manager at risk (CM @ Risk).	DB is available for CDA procurements only.
9	Use contractor inputs in the development of design, specifications, and schedule. Involve contractors in constructability review process.	Encourage the use of contractor involvement during design. Make the opportunity available to diverse groups of contractors.
10	Plan ahead and communicate requirements to material suppliers in advance.	Work with suppliers for material requirements that perform with considerations for manufacturing cost.