Transportation Department

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BOULDER COUNTY
BOARD OF COUNTY COMMISSIONERS

Public Study Session on Transportation System Impacts of Oil and Gas Development and Potential Roadway Impact Fee Analysis

Commissioners Hearing Room, Third Floor
Boulder County Courthouse
December 6, 2012
4pm

Summary: At the direction of the Board of Commissioners, the Boulder County Transportation Department initiated a study to determine the cost of incremental impacts to county roads that may result from future oil and gas (O&G) drilling and associated activities that generate significant heavy truck traffic on the county road system and determine the appropriate level and type of fee to offset such impacts.

Staff and consultants will present the draft results of the analysis for discussion and questions, before finalization of the report. **No action is requested at this time.**

Policy Direction: The Transportation Element of the Comprehensive Plan provides policy guidance on funding County transportation needs related to activities such as oil and gas development in the county. This direction includes:

> TR7.01: "Allow for special assessments to fund transportation improvements that specially benefit from such improvements,… and that funding mechanisms may include special assessments or other appropriate revenue-generating programs."
>
> TR7.03: "Explore appropriate user fee programs that take into account the full costs of travel, including immediate and long-term impacts to facilities and the environment, to help fund transportation enhancements."
>
> TR7.04: "Require property owners or developers to provide appropriate off-site transportation improvements that are necessitated by or reasonably related to the impacts of new development."

The policy direction in the Comprehensive Plan provides direction that the companies developing oil and gas wells should be responsible for mitigating the impacts to the transportation system associated with their development.

Methodology Summary: The methodology/steps used in the analysis included:

1. An inventory of existing county roadways and conditions within the Niobrara formation in eastern Boulder County
2. Information on the number of trips and vehicle types/weights associated with development and operation of oil and gas wells, assuming current commonly used techniques and practices. From this information, a travel model was developed to identify the likely number of trips and vehicle types, and associated vehicle weights on each roadway segment and the associated impacts of such development on the county transportation system.
3. Development of three scenarios: a low, steady and accelerated well development schedules based on expected COGCC spacing of wells and plausible allocation of drill rigs were developed to forecast the potential intensity and time frame oil and gas development. The table below summarizes the three scenarios that have been analyzed.

Summary of Scenarios

Scenario	# of Rigs In Use	# Pads/Year	# of Years	Total # of Producing Wells
Low	1	3	16	180
Steady	5	15	16	824*
Accelerated	10	30	9**	824

** 824 wells are the "maximum" number that can be developed in the study area assuming typical pad spacing and well clustering observed elsewhere in the Niobrara and through consultant discussions with COGCC personnel. In practice, the COGCC can approve a more or less dense field development pattern.*
*** The "Accelerated" scenario results in the same number of wells as the "Steady" scenario, but under this scenario, the wells are drilled more quickly (9 years) however the full 16-yr costs are considered in the fee calculations.*

Areas of Concern: The categories of concern associated with oil and gas development impacts consist of road deterioration and safety.

Road Deterioration: Roadways used by oil and gas traffic will experience decreased overall pavement/concrete service life, resulting in the need for more frequent, and thicker, overlays and reconstruction sooner than would otherwise be expected under current use. For unpaved roads, the improvements needed to offset the impacts of oil and gas trucks include more frequent dust suppressant application, grading, graveling, and paving where the truck volume is expected to significantly increase over an extended period of time.

Roadway Safety: Increased heavy and large truck traffic will have significant safety impacts to both drivers and bicyclists using east Boulder County roads. Eastern Boulder County experience high volumes of bicycle usage. Conflicts between bicyclists and heavy trucks, especially on roads without shoulders, would likely increase with increased heavy truck traffic. Many roads in the eastern portion of the County do not have shoulders or safe passing areas that would be necessitated by the increased demand associated with cars passing slow moving heavy trucks, trucks entering or leaving the roads to access the well sites, or safe locations for either truck or cars to pull off the road out of

traffic. Additional shoulders, or other improvements, may be needed to ensure the safety of the traveling public where substandard, or no, shoulders currently exist.

Summary of Oil and Gas Impacts on the County Transportation System			
Road Type	**Activity**	**Road Deterioration**	**Roadway Safety**
Unpaved/Gravel Roads	More frequent		
	– grading	X	
	– re- graveling	X	
	– dust suppression	X	
Asphalt Roads	– Increased overlay frequency	X	
	– Poor roads wear out more quickly, require reconstruction sooner.	X	
	– Shoulder widening where substandard shoulders exist for safety		X
Concrete Roads	– Road wears out more quickly, requires reconstruction sooner than programmed.	X	

Impact Cost Analysis

The costs associated with the impacts identified above for the "Road Deterioration" and "Safety" categories were calculated for each scenario on a systemwide basis. A systemwide analysis is necessary since the specific location of wells/pads, the number of wells on each pad, the specific routes associated with well development for a specific well are not currently known, may vary depending on the contractor and source of water, fracking sand, etc or necessarily controlled by company seeking or holding the permit.

Note on Impact to Roads from Heavy Trucks versus Cars

A major concern associated with oil and gas development is not only the number of truck trips on narrow roads, but also their weight. The weight of a vehicle is a prime factor in how much damage is done to the road. The term "Equivalent Single Axle Load", or ESAL, is used to compare the effects on roads of vehicle carrying different loads. For example, a loaded water truck is very heavy, and therefore has an impact 6,500 – 11,000 times that of a passenger car and a drilling rig truck has 20,000 - 30,000 times the impact of a passenger vehicle on the roads.

While the vehicle miles of travel on the county roads associated with oil and gas development is a small (less than 1%) percentage of background travel, the ESAL-Miles of travel associated with oil and gas development is forecast to be 20 -160% more than would occur without oil and gas development.

The total number of ESALs that a road can handle before requiring repaving or reconstruction can be estimated based on how it was built and how old it is. This is referred to as the "remaining surface life of the road".

The methodology used in this analysis estimates the proportion of the remaining surface life of the roads consumed by the oil and gas related traffic, and assigns the cost of resurfacing or rebuilding the road in proportion to the remaining surface life consumed by the oil and gas related traffic.

Where a road is already in poor condition, the assumption is made that the intense, and heavily loaded, truck traffic will require full reconstruction much sooner than under normal conditions, and is therefore attributable to the oil and gas related traffic.

Oil and Gas Transportation Impact Rehabilitation/Mitigation Costs By Scenario (2012 $)

Scenario	Total Road Deterioration Cost	Total Roadway Safety Mitigation Cost	Total Cost	Annual Average Cost (Range)
Low	$5,980,000	$2,110,000	$8,090,000	$.5m ($.01 - $.09m)
Steady	$24,760,000	$2,830,000	$27,590,000	$1.7m ($.07 - $2.6m)
Accelerated	$24,460,000	$2,480,000	$27,300,000	$1.7m (($.04m-$4m)

Oil and Gas Road Deterioration and Safety Fee

The Oil and Gas Road Deterioration and Roadway Safety Fee is designed to recoup only the incremental costs to the County transportation system resulting from oil and gas development. The fee is based on the proportional expected road usage, and associated costs to the county, from oil and gas development.

For paved and concrete roads currently in good and fair condition, the proportionate share of the remaining service life of the road consumed by oil and gas related traffic was calculated and assigned costs assigned accordingly.

The total cost of reconstructing paved segments currently in poor condition used by oil and gas related traffic is assigned to the oil and gas development. This is appropriate since these roads will require reconstruction much more quickly than would otherwise be the case and the county does not have the funds to accelerate reconstruction of these roads. Reprogramming of currently programmed funds to reconstruct of these roads would delay those currently programmed projects, with corresponding increases in their costs.

The total road deterioration and road safety mitigation costs resulting from oil and gas development for each scenario were divided by the number of new pads and producing wells installed over the 16 period.

Proposed Oil and Gas Roadway Deterioration and Safety Fee 2012 $

	Deterioration Fee	Safety Fee	Total Fee
Per Pad	$1,200	-	$1,200
Per Well	$30,700	$6,200	$36,900
	Example - 1 pad with 4 wells		
	$124,000	$24,800	$148,000