VDOT Virginia Department of Transportation

DRPT Virginia Department of Rail and Public Transportation

Virginia Statewide Multimodal Freight Study
Phase I Overview

Presented to the

Commonwealth Transportation Board

October 17, 2007

Commonwealth MULTIMODAL TRANSPORTATION OFFICE

About the Statewide Multimodal Freight Study

- **Virginia is one of the nation's leading states for freight movement**
  - **Major truck, rail, seaport, air cargo, warehouse/distribution activity**
  - **Much of Virginia's economy depends on freight movement**
  - **Freight movement impacts – and is impacted by – constraints and chokepoints in Virginia's transportation system**
- **Commonwealth Multimodal Planning office has undertaken the Statewide Multimodal Freight Study**
  - **Builds on VTrans and Virginia's modal system plans**
  - **Coordinated with other Commonwealth efforts, including purchase of freight database and truck origin-destination surveys on I-81**
  - **Informed by MPO-level freight planning and participation**
  - **Guided by Freight Advisory Committee (environmental, industry, public sector representatives)**

Freight Study Process

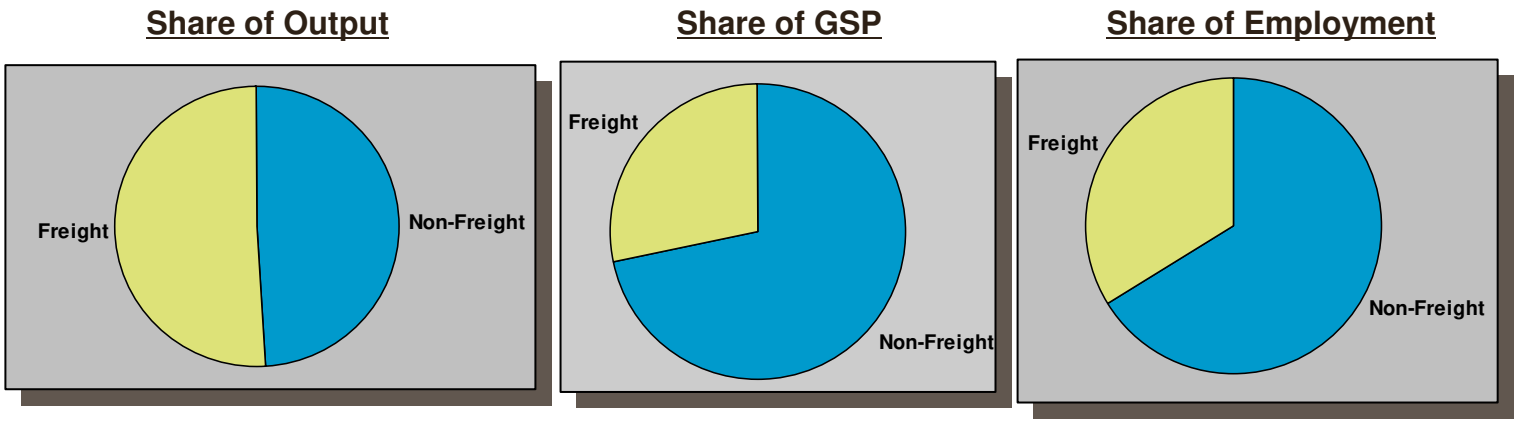
- **Statewide Multimodal Freight Study is an effort to:**
  - **Look comprehensively at Virginia freight issues – all modes, all levels (statewide, regional, corridor), all types (local, through)**
  - **Take a multimodal perspective on where we are, where we are going**
  - **Develop state-of-the-art freight transportation and economic data and analysis tools**
  - **Identify critical needs and recommendations**
- **Two-phase process**
  - **Phase I started October 2006, documents being finalized**
  - **Phase II to start soon and conclude by September 2008**

Freight Study Phase I Work Plan

- **Phase I scope of work**
  - **Outreach interviews with Virginia freight stakeholders**
  - **Status review and near-term action**
  - **Data collection (Federal, Virginia, commercial sources)**
  - **Economic and transportation profiling**
  - **Forecasting to year 2035**
  - **Multimodal system condition and performance**
  - **Analytical and data needs**
  - **I-81 truck-rail diversion analysis**
  - **Conclusions and next steps**

Virginia's Economy Depends on Freight Movement

- **Virginia's economy – ranked 21st in the world (2005)**
  - **7.6 million residents and 3.7 million employees**
  - **$658 billion in state output[1]**
  - **$352 billion in gross state product[2]**
  - **A leading international gateway with $14 billion in export value**
- **Around 50% of Virginia's output, 28% of its gross state product, and 34% of its employment, is from industries that depend heavily on the movement of raw materials, intermediate goods, and/or finished products**

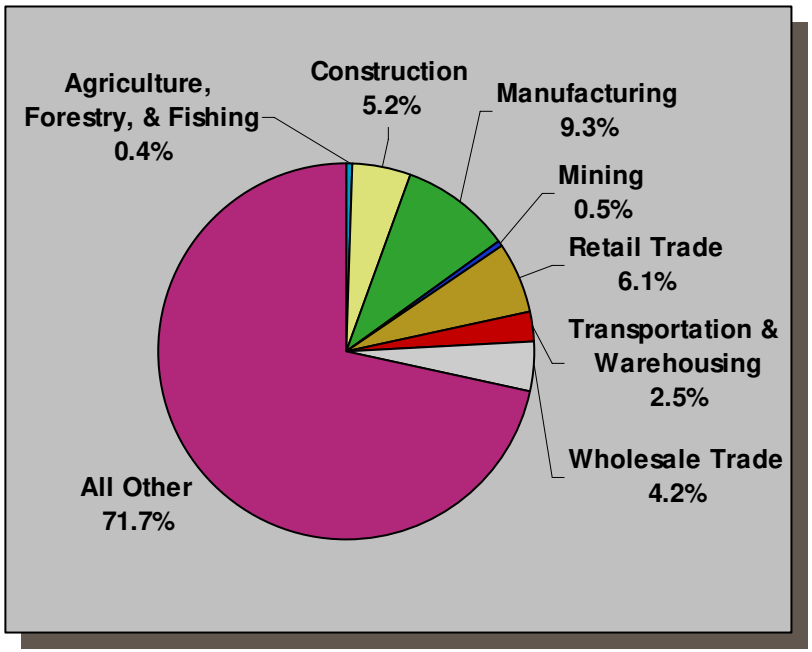


1 -- *"State Output" measures the gross value of Virginia activity – sales, receipts, operating income, etc.*

2 -- *"Gross State Product" measures the value added of Virginia activity – represents gross value minus intermediate inputs (goods and services purchased from other industries). Freight industries tend to rely heavily on intermediate inputs.*

Virginia Has Many Different Freight-Dependent Industries -- and They Are Growing

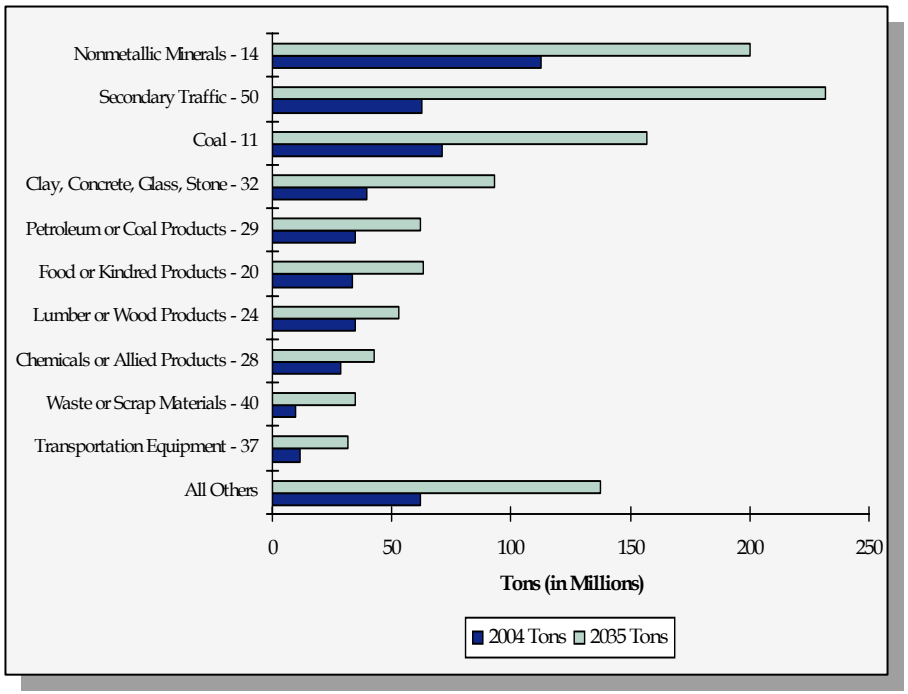
Contribution of Freight-Dependent Industries to Virginia GSP

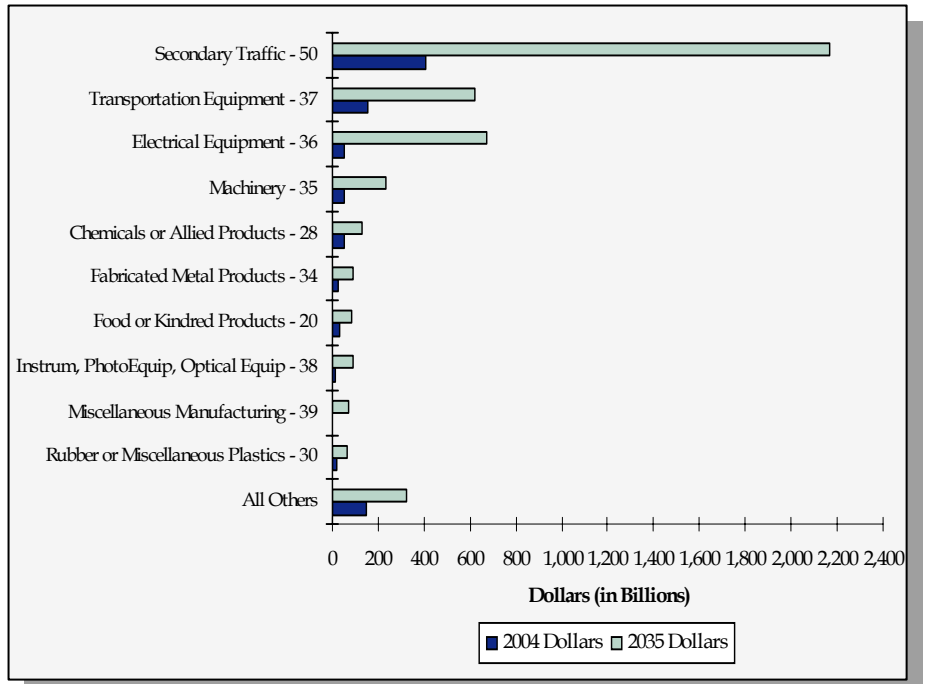


- **Current freight "clusters"**
  - **"Goods Movement" -- wholesale, air cargo, rail freight, trucking, ocean and river ports and terminals, and warehouse/distribution -- 7% of GSP**
  - **"Freight Intensive Industries" -- food, tobacco, agriculture, construction, wood and paper, machinery, transportation equipment, energy, chemical products, minerals – 15% of GSP**
  - **Retail – 6% of GSP**
- **Future growth**
  - **Virginia population to grow 30% through 2030 (VEC projection)**
  - **Freight employment to increase 20%, freight GSP to increase 70%, freight output to increase 100% through 2035 (Global Insight forecast)**

Freight Tonnage Will Grow as Freight Industries Grow – But the Commodity Mix Will Change

- **Virginia freight tonnage to grow in proportion to freight industry output**
  - **Today, highest tonnage commodities are minerals, coal, and "secondary traffic" (secondary traffic represents mixed freight shipments, usually higher-value finished goods moving in containers or "dry van" trucks)**
  - **Tonnage moving into, out of, and within Virginia will roughly double by 2035**
  - **Secondary traffic will become the tonnage leader, remain the value leader**



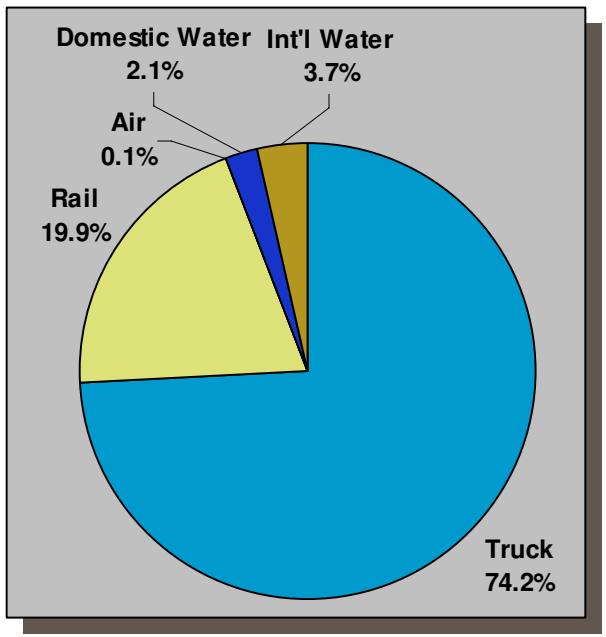


Note: This data does not include international waterborne commodities or municipal waste.

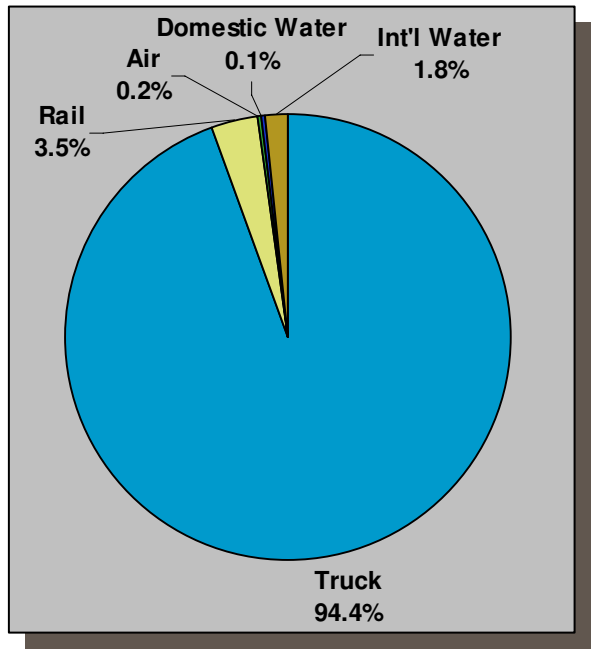
Freight Uses All Elements of Virginia's Multimodal Transportation System

- **In 2004, Virginia's multimodal transportation system handled 915 million tons of freight worth more than $2.1 trillion dollars**
  - **Includes truck, rail, air, domestic water, international water**
  - **Includes freight inbound to, outbound from, moving within, and passing through VA**
  - **Reflects transfers among and between modes – most air, water, rail traffic also involves one or more truck moves -- each leg of trip counted separately**
  - **Equivalent to 46 million truckloads; end to end, would go around the world 20+ times**

Tonnage by Mode

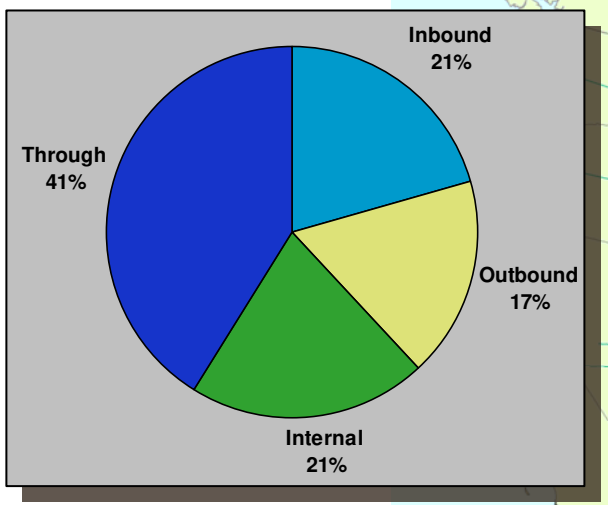


Value by Mode

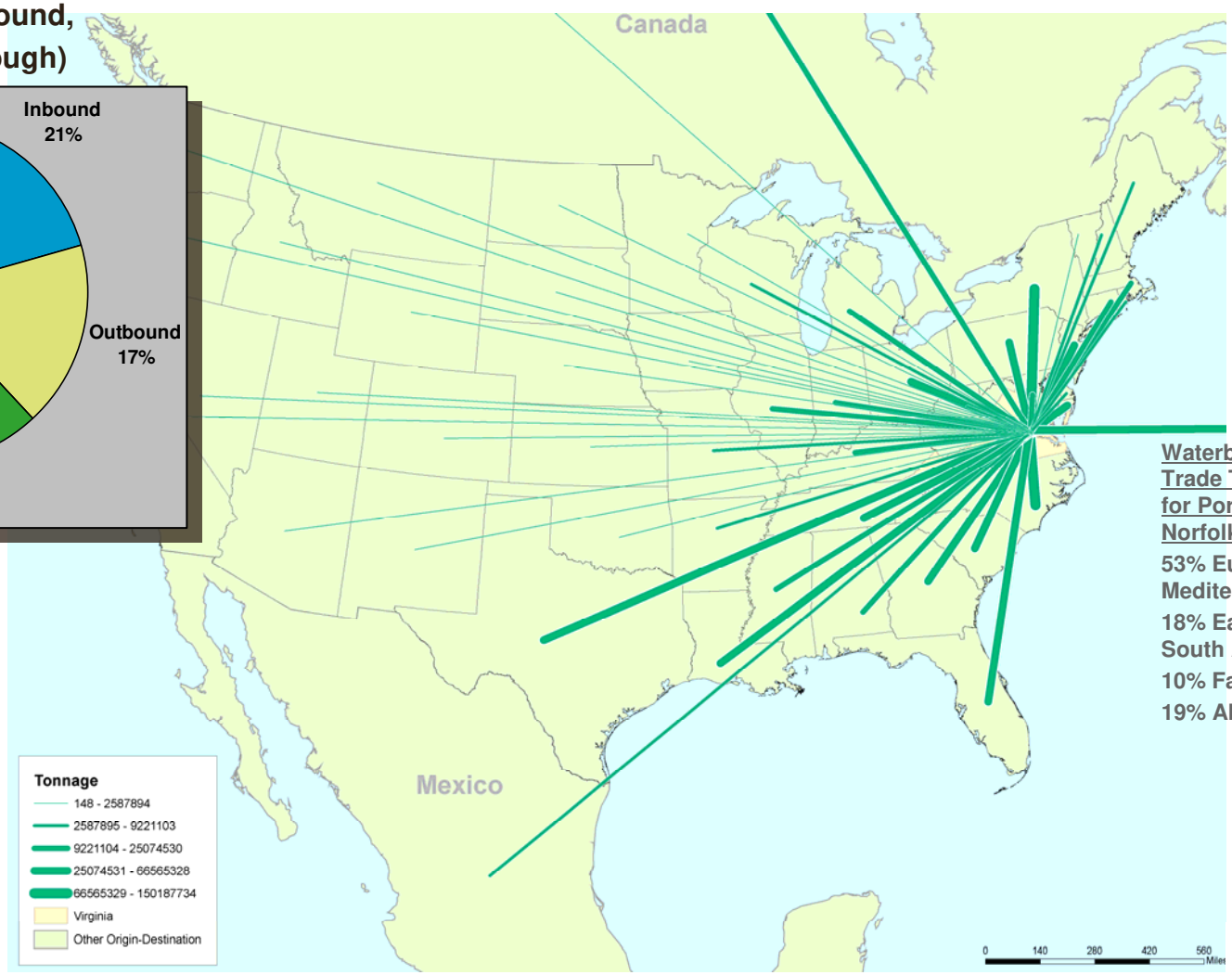


Virginia Trade is Greatest With the Mid-Atlantic, But Covers North America and the World

Tonnage by Type
(Inbound, Outbound, Within VA, Through)



Distribution of Inbound and Outbound Tonnage, All Modes



Waterborne Trade Tonnage for Port of Norfolk District

53% Europe and Mediterranean

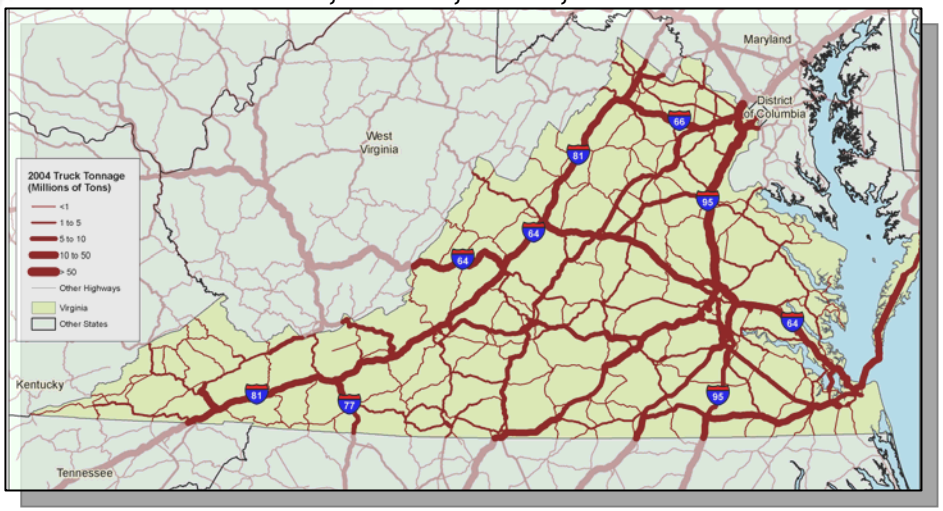
18% East Coast South America

10% Far East

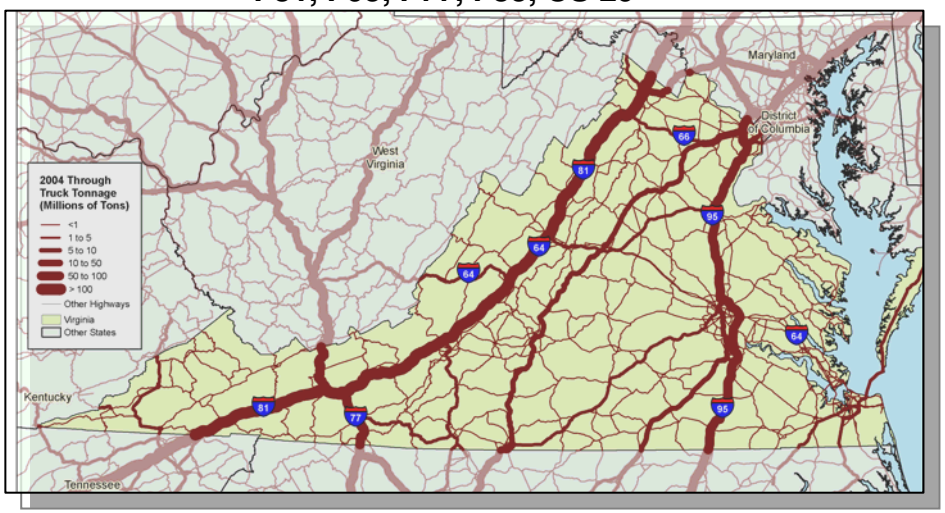
19% All Other

How Freight Uses Virginia's Roads

Virginia Tonnage (Inbound, Outbound, Internal)
I-81, I-95, I-64, I-66, I-77, I-85, I-295, US 29, US 360, US 460, US 58, US 13



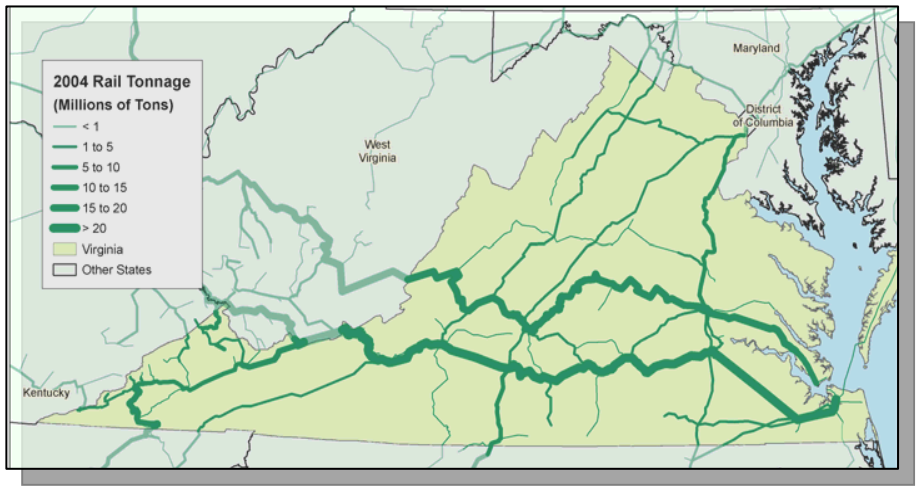
Pass-Through Tonnage
I-81, I-95, I-77, I-85, US 29



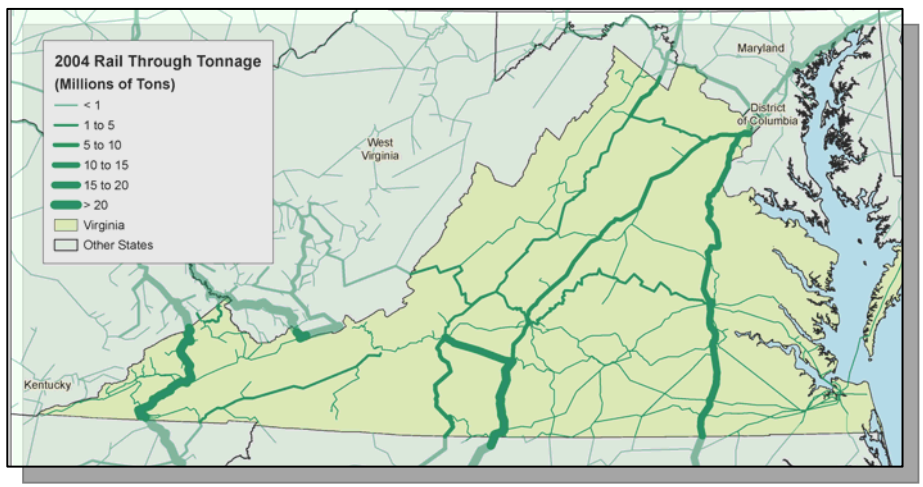
- **Virginia's Truck Network**
  - 1,100 miles of interstate; 8,000 miles of primary; 47,500 miles of secondary
  - 680 million tons, 55 million loaded units, 200 billion ton-miles (2004)
- **Critical issues today**
  - Roadway and bridge condition
  - Capacity, congestion, speed, and reliability, especially for critical corridors and urban areas
  - Safety and emergency response
  - Environment (emissions, noise, neighborhoods, fuel consumption)
  - Intermodal connectivity for ports, rail, air
  - Truck rest areas
  - Driver retention and recruitment
  - Advanced two-way information systems
  - Mode-shift strategies
  - Time-shift strategies
  - Funding
- **Critical issues by 2035**
  - How to deal with a projected doubling of truck tonnage, along with growing urban congestion?

How Freight Uses Virginia's Railroads

Virginia Tonnage (Inbound, Outbound, Internal)
NS and CSX east-west lines

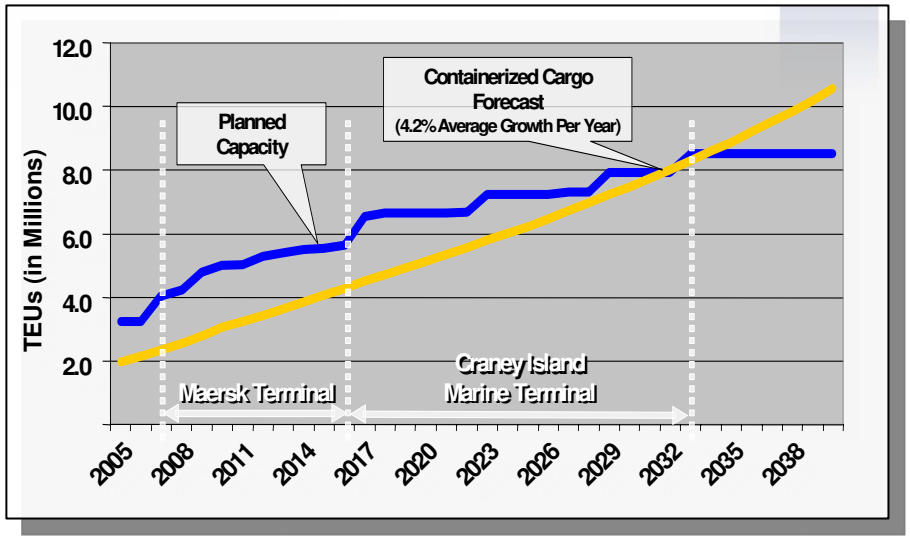


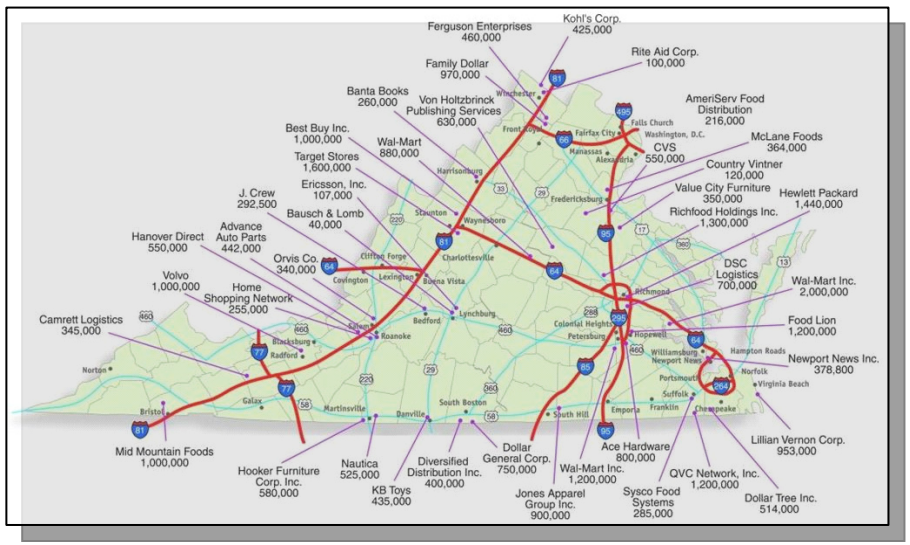
Pass-Through Tonnage
NS and CSX north-south lines



- **Virginia's Freight Rail Network**
  - 12 freight, 2 passenger railroads
  - 3,500 system miles – 2,100 for Norfolk Southern and 1,051 for CSX
  - 182 million tons (2005)
- **Critical issues today**
  - System preservation and maintenance (lines, bridges, tunnels)
  - Modernizing historic, aging infrastructure to handle heavier, larger railcars in faster and/or scheduled services
  - Port accessibility and quality of service
  - Inland ports, intermodal yards, "integrated logistics centers"
  - Shared access with passengers
  - Diversion of long haul trucks to rail
  - East-west and north-south corridors
  - Multistate coordination
- **Critical issues by 2035**
  - How to handle a doubling of rail traffic, while offsetting investment needs in other modes?

How Freight Uses Virginia's Ports and Warehouse/Distribution Facilities





- **Virginia's Ports**
  - Mix of public and private facilities
  - Hampton Roads ranks 2nd/3rd among Atlantic container ports, 15th among US ports on tonnage
  - Facilities on the James (Richmond, Hopewell), York and Appomattox rivers
- **Warehouse/distribution facilities**
  - Essential for modern import-export logistics and port growth
  - Development of private facilities in Hampton Roads, along major corridors
- **Critical issues today**
  - Port capacity, terminal expansion, truck and rail access
  - Warehouse sites (large parcels, truck/rail access, limited impact)
  - "Marine Highway" initiatives
  - Advanced operations and information
- **Critical issues through 2035**
  - How to handle a quadrupling of container traffic and a doubling of total tonnage by improving port facilities and operations, while managing transportation and environmental impacts?

How Freight Uses Virginia's Airports



OPERATIONAL CHARACTERISTICS OF VIRGINIA CARGO AIRPORTS

Airport	2005 Total air cargo (tonnes)	Airline Service/ Capacity *(a)*	Number of commercial length runways	Length of longest runway (feet)	Distance to connecting transport (b)	Cargo warehouse (sq. feet)	On-site customs & agriculture inspections	FTZ access	Average customs clearance time required
IAD	303,012	40, 5	3	11,500	14, 35, 60, 50	1,229,128	Yes	Yes	1 hour
RIC	49,614	8, 3	2	9,000	5, 5, 30, 25	142,000	Yes	Yes	2 hours
ORF	31,791	7, 3	2	9,000	5, 5, 5, 5	88,000	No	Yes	2 hours
ROA	14,333	5, 3	2	6,800	5, 10, 150, 20	n.a.	No	No	Unknown

* - Indicates that facilities are on airport property.
(a) First number is total carriers and second is all-cargo (including integrated) carriers.
(b) Numbers, in order, are distance, in miles, to major highway, truck terminal, major water port (inland), intermodal center.

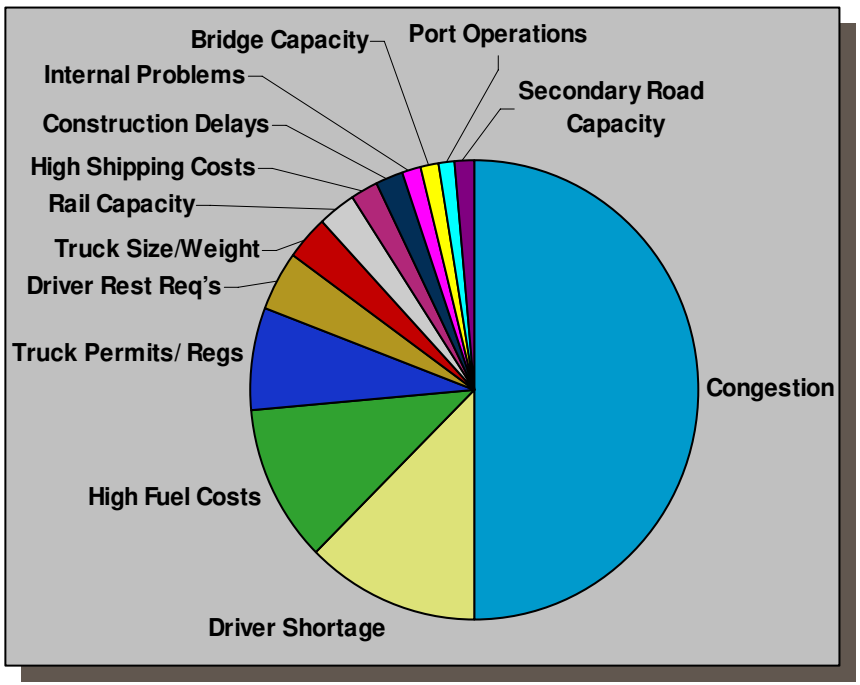
Source: 2005 Airport Directory, Air Cargo World, 2006.

- **Virginia's Airports**
  - **Unique market niche -- high-value, time-sensitive commodities – critical service for many industries**
  - **Just 0.1% of tonnage, but more than 4 billion dollars in shipment value**
  - **Four major cargo airports (Dulles, Richmond, Norfolk, Roanoke) ranking 23rd, 72nd, 86th, 112th in US tonnage**
- **Critical issues today**
  - **Air freight through Virginia does not suffer from significant bottlenecks – good facilities, good ground access**
  - **Competition from out of state airports for international service – shippers will truck to JFK, O'Hare, other airports because of more frequent wide-body services**
- **Critical issues through 2035**
  - **Air tonnage is expected to triple by the year 2035 – second-fastest growing segment of freight industry**
  - **Facility capacity and ground access need to keep pace, seems achievable**
  - **Could Virginia be more competitive for international services? Does Virginia need more domestic options?**

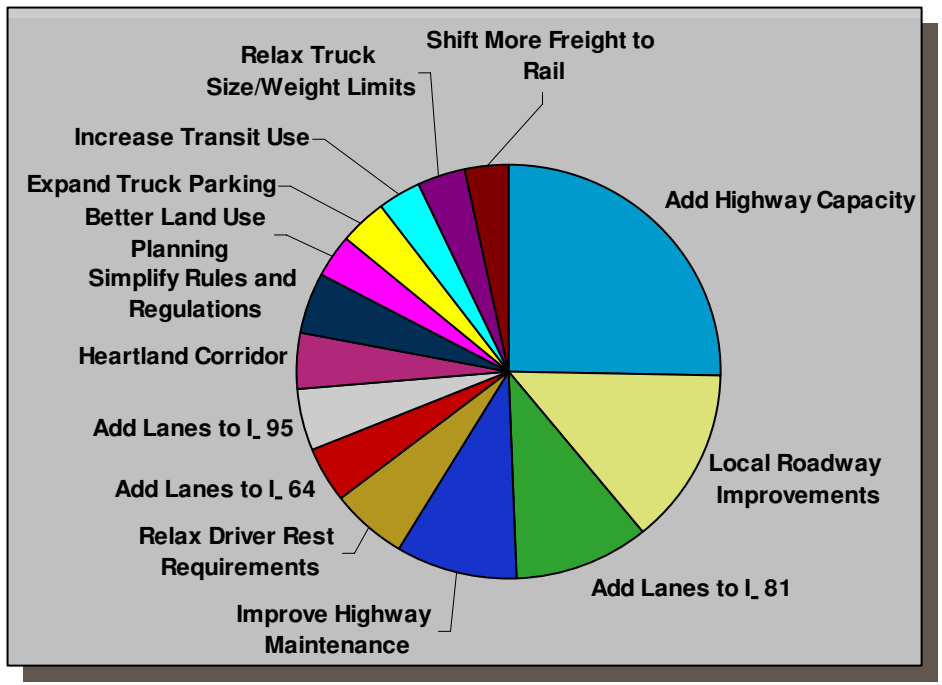
What do Virginia's Freight Users Think?

- **Nearly 200 freight shippers, receivers, carriers interviewed by Virginia MPOs, Commonwealth and consultant**
  - **Overall, 63% of respondents say Virginia's system is adequate; high of 86% in Harrisonburg, low of 25% in Northern Virginia**
  - **Highway congestion is the number one freight concern, especially in Northern Virginia, Hampton Roads, I-81 Corridor, I-95 Corridor**
  - **Most recommend adding highway capacity, improving rail options**

Reported Problems



Recommendations

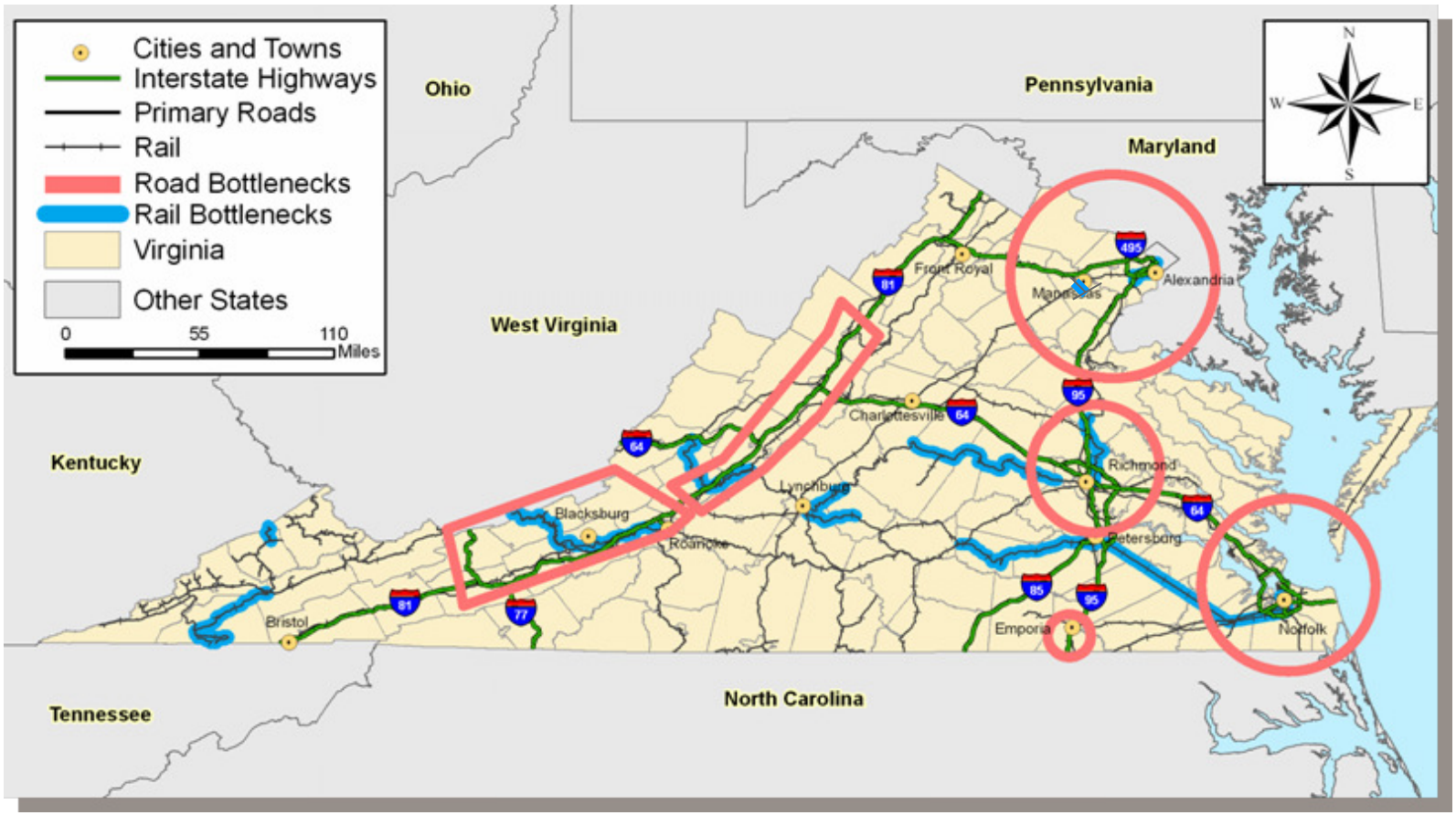


Why do Freight Users Care About Congestion?

- **National data**
  - **Congestion adds $7 billion per year to shipper inventory costs (source: FHWA) ... "Unpredictability of pickup or delivery can increase load cost by 50% to 250%" (source: Cowan Systems)**
  - **Truck operations cost an average of $77.10 (source: TTI) ... "Idled trucks cost the trucking industry $7.8 billion and 243 million hours in 2004" (source: Cowan Systems) ... in MD, the average UPS truck delivery is delayed 36 minutes, costing $1.1 million annually (source: UPS)**
- **Virginia data (source: FHWA HERS model)**
  - **In 2005, trucks on Virginia's roads experienced an estimated 8.4 million hours of delay, costing $278 million**
  - **VDOT's FY 2007 budget calls for $2.6 billion in road maintenance and highway construction; with average expenditures of $2.7 billion annually (current dollars) through 2035, Virginia truck delay will increase to an estimated 14.0 million hours, costing $466 million, in year 2035**

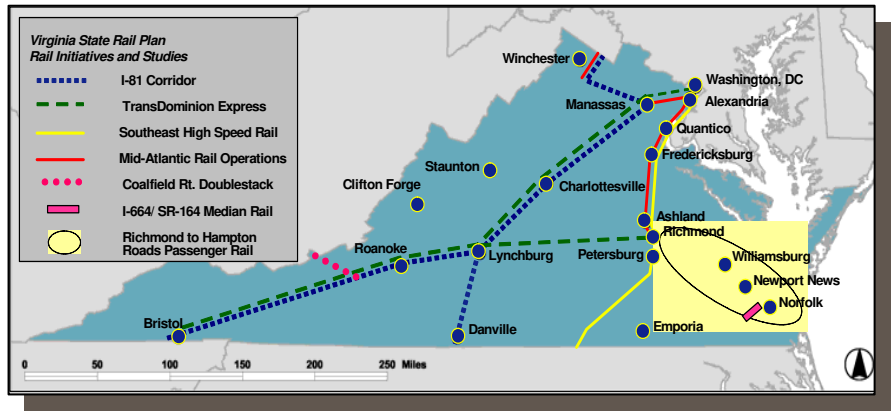
Where are the Most Pressing Needs?

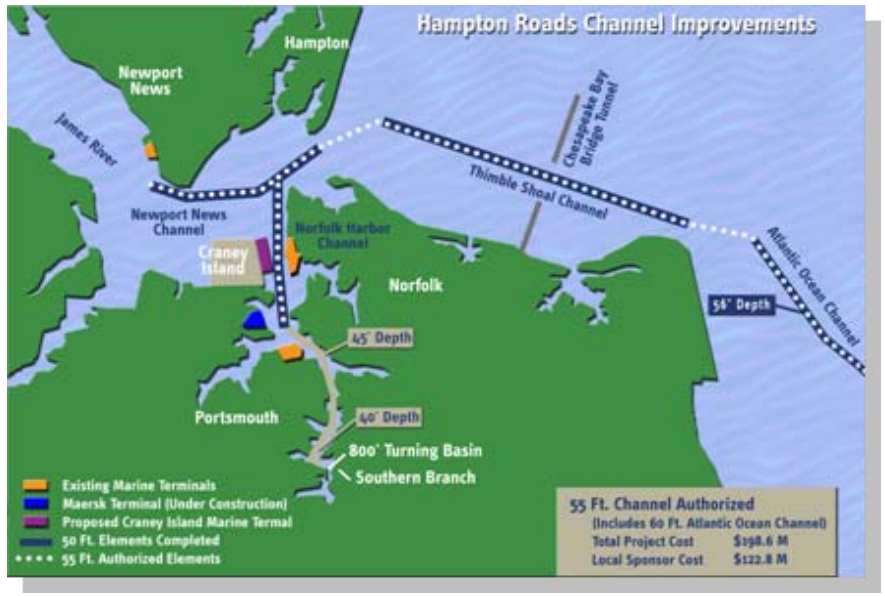
- **Urban congestion – Northern Virginia, Hampton Roads, Richmond, Roanoke**
- **Critical multimodal corridors – interstate and state highways, rail routes**
- **Port capacity and port access**



Many Commonwealth, Regional, and Public/ Private Initiatives are Addressing Freight

- **Highway plans/studies**
  - I-81 Near-Term Safety Improvements and Corridor Improvement Study, I-81 Truck-Rail Diversion Study
  - I-95/I-395/Capitol Beltway improvement projects; I-66 Improvements; Route 460 Location Study; I-64 Improvements; I-564 Port Connector; Route 29 Corridor
  - Hampton Roads Third Crossing concept
- **Rail plans/studies**
  - Heartland Corridor
  - Crescent Corridor
  - Mid Atlantic Rail Operations
  - Route 164/664 Median Rail
  - Other Virginia State Rail Plan and Rail Enhancement Fund projects
- **Port plans/studies**
  - Maersk Terminal and on-dock rail
  - Craney Island development
  - VPA Master Plan initiatives
- **Other**
  - Airport CIPs and Dulles Rail
  - Private warehouse/distribution development





I-81 Truck-Rail Diversion Study

- **Virginia Legislature mandated a study to determine the required conditions to divert the maximum amount feasible of long-haul through truck traffic in the I-81 Corridor to rail**
  - **Subtask of the Virginia Statewide Multimodal Freight Study**
  - **Cooperative effort between the Commonwealth and the Norfolk Southern Rail Road**
- **Scope and status**
  - **CS reviewed past studies and available analytical tools**
  - **Commonwealth conducted I-81 truck survey to quantify the percentage and composition of 'pass through' truck traffic**
  - **CS developed diversion targets for planning purposes**
  - **NS conducting network modeling**
  - **NS and Commonwealth proceeding with limited initial improvements**
- **Next steps**
  - **NS to provide internal market estimates, capital needs, operations data, business metrics -- not limited to legislature's target**
  - **CS to perform independent review of NS inputs**
  - **CS to estimate public benefits versus public costs, in cooperation with Virginia DRPT**
- **Critical issues**
  - **What investments – private and public – will be needed to reach different levels of diversion? What are the respective benefits of these investments? What level of diversion generates the most public benefit at the least cost to the Commonwealth?**

Phase I Conclusions

- **Currently, Virginia's freight system is generally performing at a high level, but it faces increasing pressure to maintain performance and keep pace with growing demand.**
- **Maintaining and improving freight system performance will enhance Virginia's competitiveness and attractiveness as a business economic location, as a preferred gateway for global trade, and as one of the nation's best places to live and work.**
- **Virginia has significant freight needs, with large dollar costs, and very constrained funding for improvements. It is critical to make the most efficient use of Commonwealth resources, public-private partnership opportunities, and innovation. This requires a multimodal approach to freight transportation planning and programming, supported by the best available data and analytical tools, and informed by meaningful input from public and private interests.**
- **Phase I was designed to collect data and inventory conditions and needs. The next step is to develop freight policy and infrastructure recommendations, along with the transportation and economic analyses to support them.**

Key Questions to be Addressed in Phase II

- **Given Virginia's projected freight needs, and given the improvements that are already in the planning stages, is it enough? Or will there still be critical deficiencies?**
- **What are the economic and transportation costs to Virginia of these deficiencies? Conversely, what are the economic benefits of addressing them?**
- **What additional improvements – whether infrastructure, policy, or institutional – will be needed to meet Virginia's emerging and future needs? How will critical corridors and regions be affected? What are the key scenarios and variables for growth, the environment, and other critical factors?**
- **How will needed improvements be funded? What are the fair and appropriate contributions of governments, and of the private sector?**
- **How should the Commonwealth approach freight planning on a consistent institutional basis, with its public and private sector partners, in Virginia and other states?**

Multimodal Corridors and Subregions for Phase II Analysis

