

## 2. PROJECT CHARACTERISTICS

The Draft Environmental Impact Statement documents the numerous alternatives that were developed and evaluated for Route 460. In November 2005, the Commonwealth Transportation Board selected the Candidate Build Alternative ("CBA") 1 as the preferred alignment for new U.S. Route 460. The team's proposed concept for a relocated Route 460 concurs with the Commonwealth Transportation Board and has identified the alignment of CBA 1 as the most technically feasible general alignment as described in the Draft Environmental Impact Statement, and as further described herein.

### 2.1. DESCRIPTION OF THE TRANSPORTATION FACILITY

U.S. Route 460 is one of two main transportation corridors connecting the Richmond/Petersburg area with Hampton Roads. Traffic traveling to and from the Hampton Roads area currently using Route 460 will not pass through any tunnels, which are frequently congested. However, the Route 460 corridor has documented design and operational deficiencies, along with accident rates that are higher than other rural principal arterial roadways in Virginia. Route 460 is accommodating increased freight shipments, and the truck percentages for Route 460 are significantly higher than the national average for rural roads with similar classifications. And, freight traffic is forecasted to increase due to expansions at the Port of Virginia.

The team's proposed concept for a relocated Route 460 generally follows the alignment of CBA 1 as described in the Draft Environmental Impact Statement. The western terminus of the project begins at the existing interchange at I-295 and Route 460 in Prince George County, which is expected to be modified to accommodate the proposed Route 460 on new alignment. The newly aligned Route 460 generally parallels the existing Route 460 to the south and extends through Sussex County, Southampton County, Isle of Wight County, and connects with U.S. Route 58 in Suffolk.

The proposed roadway is a four-lane, divided, limited-access highway for its entire length of approximately 55 miles. Interchanges are expected to be provided to maintain access to the localities within the region, as indicated:

- Interstate-295 (Prince George County, near Petersburg)
- Route 156 (Prince George County)
- Route 625 (Prince George County, Disputanta)
- Route 602 (Sussex County)
- Route 40 (Sussex County, Waverly)
- Route 620 (Sussex County, Wakefield)
- Route 616 (Southampton County, Ivor)
- Route 258 (Isle of Wight County, Windsor)
- U.S. Route 58 (Suffolk By-Pass)

In addition to the above interchanges, VCP would, following consultation with VDOT, also consider constructing a direct link servicing the container port development.

The team proposes to maintain connectivity within the region by constructing grade separated bridge structures to carry secondary roads over (or possibly under) new Route 460 at numerous locations in each county. Some roads that experience very low traffic volumes, and where users can be conveniently re-directed to adjacent roadways, will come to an end with a cul-de-sac. It is hoped that all properties that are adjacent to the new roadway can be accessed from the existing roadway network. Our proposal does not include construction of frontage roads for access to properties.

Our team has identified approximately two dozen locations, totaling several miles in length, which may require the spanning of streams and/or wetlands with bridges or culverts. A number of these locations may require bridges in excess of 1,000 feet in length. The most significant stream crossing will be the bridge over the Blackwater River, downstream from Zuni, which is estimated to be several thousand feet long. Our team is knowledgeable in the design and construction of structures spanning streams and wetlands in eastern Virginia. We are familiar with methods employed to minimize impacts to natural resources in the design of the structure, during construction operations, and in final configuration.

Relocated Route 460 will serve as a hurricane evacuation route for the Hampton Roads region. Establishing the proper elevation of the roadway and bridges along the alignment will be vital to the proper functioning of the facility immediately before and after a hurricane event. Defining the design requirements to satisfy the needs of the hurricane evacuation route will require further analysis and evaluation to insure Route 460 will function during these critical times. For purposes of this proposal, the team has anticipated that the roadway profile and the underside of bridge structures are planned to maintain two feet of freeboard above the 100-year flood surface elevations.

#### Project Tasks:

- Design
  - > Alignment - plan and profile
  - > Geotechnical - investigation and baseline report
  - > Pavement, Bridge, and Drainage design structures
  - > Environmental mitigation and permitting - wetlands, pollution, and sediment control
  - > ROW Acquisition - survey, purchase, litigate
  - > Safety, Maintenance of existing traffic - design and monitoring
  - > Plans and specifications - work product, deliverables
- Construction
  - > Schedule - develop, submit, monitor, update, adherence
  - > Budget - fixed price contract
  - > Subcontracting - competitive bidding, local opportunity
  - > Training, M/W/DBE - compliance and goals
  - > Earthwork - cut, fill, undercutting, borrow pits, suitable material

- > Structures - bridges, culverts and ditches, buildings, lighting, signage
- > Paving - crushed aggregate, asphalt, concrete
- Operation
  - > Tolls - collect, advertise, innovate, maximize revenue
  - > ITS - notification, signage, movement and flow, monitoring, emergencies
  - > Maintain - clean and clear, re-build and replace, preventive maintenance
  - > Transactions - clearing back office paper, collecting tolls, distributing transponders
  - > Coordination - local authorities, police, weather, emergency
- Maintenance
  - > Clean and clear
  - > Re-build and replace
  - > Preventive and scheduled maintenance
  - > Prepare for hand-back
  - > Technology upgrades

## 2.2. PROJECT IS CONSISTENT WITH APPLICABLE STATE AND FEDERAL REGULATIONS

The proposed alignment for Route 460 was thoroughly evaluated in the Draft Environmental Impact Statement ("DEIS") as CBA 1. As such, we are unaware of any inconsistencies with applicable state and federal statutes. The DEIS also indicates that CBA 1 alignment is in conformance with desirable design standards. Our team of engineers and environmental scientist realize that further project development will need to be in accordance with applicable requirements and in a partnership with governmental agencies. Furthermore, our experienced team realizes that a project of this magnitude may require design exceptions or modifications to serve the best interest of all parties. We will work with VDOT and other applicable agencies to provide a safe and effective design for the project. Our team is not aware of any inconsistencies with applicable state and federal statutes.

## 2.3. WORK REQUIRED BY OTHER AGENCIES

There are many options for assigning responsibility to various parties to perform all of the necessary tasks to implement this project. In many cases, the cost of performing a certain function is lower for one of the parties. In other cases, the resources, expertise, power, or willingness is found in one or another of the parties. One aspect of this decision is retention of control and/or responsibility for delay and cost impacts of performing the function. Virginia Corridor Partners is willing and able to perform all of the responsibilities necessary to design, build, and operate the U.S. Route 460 Corridor Improvements Project. We have prepared an estimate that is fully compliant with the parameters of the DEIS and in which we are fully responsible for all major functions. We foresee, however, an opportunity to reduce

the cost of the project and the financing needed to go forward by suggesting the following elements for consideration:

#### POSSIBLE WORK BY OTHERS (RESULTING IN COST REDUCTIONS)

- VDOT perform all (or some) ROW acquisition functions, including negotiation, surveying, purchase, and condemnation.
- VDOT perform all (or some) permit duties upon receipt of design plans and specifications from the Design/Build Contractor team. This would include fees, applications, and maximizing the benefits of intergovernmental relations to "fast-track" permit approval.
- VDOT performing all back office functions for electronic tolling including clearing, validating, and enforcing toll accounts with users - new, existing, abandoned, and in default.
- VDOT could provide an Owner-Controlled Insurance Program ("OCIP") for the project saving significant sums above what commercial rates would dictate.
- VDOT could provide all ROW acquisition, design, and construction services for any and all frontage road/local road connections necessary throughout the alignment.
- VDOT could compress the procurement schedule, saving a year and perhaps 7.5% in escalation of total project costs to the start of construction.

These ideas are all cost-saving measures which VCP can and will perform, if required. However, VDOT can and does regularly perform this kind of work and could do it more cheaply and efficiently. We have prepared two estimates in anticipation of proposing an alternate scope of work. The second estimate saves \$350 million and two years on the project schedule. We would be happy to explore modifications to the expected scope if the benefits are attractive to VDOT. The total project costs are more easily financeable, if some or all of these options are exercised.

## 2.4. LIST ALL PERMITS AND APPROVALS

Virginia Corridor Partners believes VDOT has the capabilities to streamline the permitting process and limit the schedule risks associated with the 460 Corridor Improvements Project. Therefore, we would look to VDOT to exercise the governmental relationships and policies already in place for obtaining permits for the project. We understand the effort required to obtain these permits, and are prepared to ensure a cohesive relationship between the development of the project and the permitting process. At project onset, the Design/Build team expects to appoint an experienced Permitting Director to assist VDOT whose sole responsibility will be to identify required coordination efforts between the Design Build team and the permit acquisition effort throughout the permitting process for this project. This individual will work closely and coordinate with VDOT representatives to assure compliance with VDOT procedures and environmental goals and to ensure that all design documents required for permitting are available to VDOT for permit applications.

Environmental permitting is expected to be the most time consuming facet of the overall permitting process. The DEIS identified the following required environmental permits:

- Army Corps of Engineers authorization for work in waters of the U.S. (including wetlands) under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act of 1899.

- Authorization from the Virginia Marine Resources Commission for construction in state subaqueous lands under Title 62.1 of the Code of Virginia
- Virginia Department of Environmental Quality authorization for work in waters of the state under the Virginia Water Protection Permit program.
- A Stormwater Management Program Permit issued by the Virginia Department of Conservation and Recreation.
- In the event of adverse affects to historic properties, a Memorandum of Agreement would need to be executed between the FHWA and the Virginia Department of Historic Resources.
- Conversion of lands within designated Agricultural / Forestal Districts associated with CBA 1 may require approval from the Isle of Wight County Board of Supervisors. If so, VDOT would submit a "Notice of Intent to Acquire Land in Agricultural / Forestal District" to the County.

Of the permits listed above, the most time sensitive will be wetlands and stream impacts permitting with the USACOE and VDEQ. Additionally, the more stringent wetland regulations including the Chesapeake Bay Regulations and those enforced in the City of Suffolk and Isle of Wight County would have to be considered. Because the wetland permitting process can be very time consuming, we propose to break the project into segments to expedite the permitting process, and if this is acceptable to the USACOE and VDEQ, approximately six months would be required to complete the following steps for the first segment:

- Pre-Application Agency Coordination
  - > Wetland Impact Determination and Mitigation
  - > Wetland Delineation and Survey
  - > Wetland Mitigation Site Evaluation
  - > Conceptual Mitigation Plan Preparation
- Stream Impact Determination and Mitigation
  - > Stream Restoration Site Evaluation
  - > Stream Restoration Plan Preparation
- Threatened/Endangered Species Impact Determination/Mitigation
  - > Threatened/Endangered Species Mitigation Plan Preparation
- Prepare Engineering Drawings
- Prepare Non-engineering Application Materials

Upon completion of the above activities, the permit applications will need to be submitted to the USACOE and VDEQ. We estimate that the agencies require approximately 12 months for review.

In the event the Route 460 project must be managed in a single environmental permitting effort, approximately nine months would be needed to conduct the studies and prepare the permit application materials. The agency review time could extend to 15 months.

Permitting Schedule - per the Project CPM schedule

- July 2008 - June 2009 Permit development (prepare sufficient engineering to apply)

- July 1, 2009 Permit applications to other Agencies for review and approval
- July 1, 2009 Full permit application to the Army Corps of Engineers
- January 1, 2010 Approvals from other Agencies
- July 1, 2010 Corps of Engineers approval
- July 1, 2010 Begin construction

Aside from the known permit requirements discussed in the DEIS and in this document, additional permitting may be needed. The Permitting Director will research the need for additional permits and will coordinate with VDOT to assure that all requirements are fully met in a timely fashion. Further, the Team will, as appropriate, coordinate and cooperate with all of the following public and affected local governments to ensure that all permitting requirements have been met.

- U.S. Army Corps of Engineers
- U.S. Environmental Protection Agency, Wetlands Section
- U.S. Fish & Wildlife Service
- U.S. Coast Guard
- National Marine Fisheries Service, Management Division
- President's Advisory Council on Historic Preservation
- Virginia Department of Game and Inland Fisheries, Environmental Officer
- Virginia Department of Historic Resources
- Virginia Department of Conservation and Recreation
- Virginia Marine Resources Commission
- Virginia Department of Environmental Quality
- Local wetlands boards
- All cities/towns/counties affected by the project

The final design of the project will adhere to the commitments as described in the Final Environmental Impact Statement ("FEIS"). Therefore, the scope of the work or related costs necessary to comply with environmental commitments is unknown. One of the first tasks during the final design of this project is to identify the environmental issues and commitments reflected in the approved FEIS. Environmental issues anticipated to be addressed in the final design include:

- Noise
- Water Quality
- Wetland / Stream Mitigation
- Waters of the U.S.
- Archaeological Sites
- Contaminated Sites
- Endangered Species
- Environmental Justice
- Conversion of lands within designated Agricultural / Forestal Districts

## 2.5. IDENTIFY ADVERSE IMPACTS

The construction of Route 460 as a limited access highway on new alignment offers numerous benefits to the citizens of the Commonwealth. These advantages are identified in the DEIS, and include:

- Improved safety for drivers;
- Accommodation of increasing freight traffic, providing greater efficiency for the Port of Hampton Roads;
- Reduced travel delays;
- Improved Strategic Military connectivity;
- Increased hurricane evacuation capability; and
- Improved economic development for local governments.

In addition to being identified in the DEIS, these positive aspects of the proposed Route 460 are addressed in more detail in Section 4 - Public Support.

There are also some concerns that have been identified in the DEIS, and which will need to be further addressed in the planning of the project. They include

- The by-passing of communities along the corridor. However, this issue was researched and analyzed in context in the DEIS, and both positive and negative impacts from new location by-passes can be expected.
- In addition, the DEIS highlighted the potential impacts to streams and wetlands. Our team will strive to identify opportunities to minimize and avoid impacts to natural resources during the design and construction of the project.

## 2.6. CRITICAL FACTORS, MANAGEMENT, AND QUALITY

### 2.6.1. Critical Factors

Based on VCP members' experience gained from successfully developing, operating and collaborating on toll road projects around the world, we understand that the Project's success depends on the following critical factors:

TABLE 2. 1: CRITICAL FACTORS

Critical Factor	Mitigation Measure
Co-operation from beneficiaries and governing authorities regarding required contributions	<ul style="list-style-type: none"> <li>▪ Early assessment of feasibility of revenue sources to ensure project can be fully funded</li> </ul>
Obtain a fixed price Design/Build contract	<ul style="list-style-type: none"> <li>▪ Negotiate and lock in agreement with contractor</li> </ul>
Comprehensive Agreement terms	<ul style="list-style-type: none"> <li>▪ Investment of time to understand commercial issues and reach agreement with VDOT</li> </ul>
Defining and extracting Project value	<ul style="list-style-type: none"> <li>▪ Accurate assessment and application of motorists' (commercial and passenger) value of time</li> </ul>



Record of Decision (“ROD”)	<ul style="list-style-type: none"> <li>Ensure ROD matches project scope and what is financially viable</li> </ul>
Project feasibility	<ul style="list-style-type: none"> <li>Matching Project scope with funding and revenues (capital cost vs. funding)</li> </ul>
Minimize Construction Schedule/Timeframe	<ul style="list-style-type: none"> <li>Reduced procurement duration, “fast-track” permitting, and rapid ROW acquisition</li> </ul>
Cost-effective solutions	<ul style="list-style-type: none"> <li>Innovative physical solutions, which include considerations of Project life-cycle costs</li> </ul>
Public acceptance of the Project	<ul style="list-style-type: none"> <li>Effectively collaborating with VDOT and other state, federal and local agencies to develop consensus and public support for the Project</li> </ul>
Maintaining Project implementation schedule to commence revenue service	<ul style="list-style-type: none"> <li>Assigning an experienced Project development team to meet Project challenges in a timely manner</li> </ul>

VCP has assembled a strong Project development team committed to establishing positive, trusting relationships, and quickly resolving action items and issues. VCP has the strong transportation infrastructure experience and qualifications necessary to effectively deliver quality in all aspects of the Project and meet, or exceed, all of VDOT’s objectives. We are proposing a conceptual implementation approach that maximizes Project value, and we look forward to developing a partnership that benefits all Project stakeholders.

### 2.6.2. Management of the Design and Construction Phase

The Tidewater Skanska/Lane Construction Corporation JV (“Tidewater/Lane”) has extensive design/build experience and has shown that a Task Force approach is a key to realizing a successful project. This open forum of discussion, in the spirit of partnering, serves to clearly define project criteria, ensure the owner’s intentions are being met, address corridor-wide constructability issues, and provide consistency in design, all before they become schedule-critical.

Task Forces serve as a conduit for disseminating project-critical information. Therefore, the Task Force, with the Design/Build Project Director at the head, is the central point of decision-making and communication among all involved in the project. As part of this process, the Owner, Developer, Contractor, and Designer are charged with reaching a consensus on project issues. This approach of equal representation by the Owner, Developer, Contractor, and Designer is integral to the partnering process. The Task Force team plans to meet weekly at first, then as needed as the project progresses. The Task Force meeting agenda expects to address project coordination, schedule review and implementation, and the overall project work plan. Reporting on partnering goals will be included in the agenda. The Task Force meetings will be formal, with agenda and meeting minutes required.

#### D/B Philosophy

The Tidewater/Lane Team’s management philosophy promotes active partnering; assignment of qualified personnel; effective and

Our Project Management Approach: Safety is the number one concern in all our construction projects. As with Safety, Quality is built into our Project Management plans and executed from day one to the last day of construction. Partnering is also a common thread in the Tidewater/Lane Team approach. Partnering is



constant communications; accurate and timely reporting; co-location of design staff; sufficient allocation of resources; and use of proven procedures.

based on the common sense premise that the owner and the contractor have shared goals, including an on-schedule, on-budget, quality project with safe working conditions. Our experience has shown that we can best achieve our goal of providing owners with the most value for their construction dollar in the teamwork environment that partnering encourages. Reviews and meetings are two aspects of our project management philosophy essential to bringing elements of the Team together. The Tidewater/Lane Team has developed practices to manage much of the "who, what, when, where and how" of these two management activities. This starts with detailed daily staff meetings for coordination during construction. Internal weekly schedule meetings are utilized with three-week "Look Ahead Schedules", and weekly Owner meetings are encouraged to facilitate communications and proactive problem avoidance.

Tidewater/Lane expect to provide the managerial and technical expertise to effectively direct the design and construction processes to complete the U.S. 460 Corridor Improvements Project on time, within budget, and in full compliance with project specifications. Our approach to achieving these objectives includes:

- Rigorously institute the concept and practice of partnering with VDOT and all Project Stakeholders;
- Staff the project with qualified personnel, designers, and subcontractors knowledgeable regarding VDOT standards and specifications;
- Establish proper channels of communication to effectively promote constructability, durability, and maintainability as key components of the design process;
- Implement accurate and timely progress reporting procedures to closely monitor the design and construction process;
- Co-locate key design and construction staff in a site office to facilitate effective communications, close coordination, quality work, and timely reviews; and
- Provide the resources and procedures to systematically review the design and construction means, methods, practices, and products to ensure conformance to the project specifications.

The Project Management approach developed by Tidewater/Lane for the construction of the U.S. 460 Corridor Improvements Project takes maximum advantage of combining the overall construction of the project into one responsible entity. In addition, we incorporate lessons learned from other similar projects and from the unique qualifications of the management personnel proposed for this Project. With the exception of specialty items such as fencing, signing, guardrail, lighting and signals, Tidewater/Lane plan to self-perform most of the entire project as a Prime Contractor. As a dedicated subcontractor, English will contribute additional management and resources to the project. Tidewater/Lane expects to be directly responsible for performing all civil work with overall management for any subcontract work involved in the project.

### 2.6.3. Quality Control and Quality Assurance

Virginia Corridor Partners recognizes that Quality Assurance ("QA") programs are a vital part of any major construction program. The QA function at the highest level is necessary to monitor, audit, and oversee the Design/Build Contractor's Quality Control program. Because we feel that quality assurance is a critical role on this major project, we have committed to engaging a Consultant to act as our QA Auditor, reporting directly to the VCP Program Director. The QA Auditor is responsible for ensuring, through regular audits, that all aspects of the design and construction program are being executed in strict compliance with the DBC's management plan and with all aspects of the approved Quality Assurance Plan ("QAP") and Quality Control Plan ("QCP"). The QAP and QCP will be fully ISO9001 compliant.

The Design/Build Contractor plans to prepare and submit for approval a Contractor Quality Control ("CQC") plan. The DBC's CQC plan will describe the material sampling and testing to be performed by laboratories and testing agencies under contracts to the design and construction contractor. The contractor will be responsible for paying for and coordinating all testing services. VCP will review and approve the laboratories contracted for testing. The QAP will document the audit and inspection procedures to be performed by VCP's Consultant visiting these laboratories. Documentation from State-regulated concrete batch plants will also be a part of the auditing and review process for CQC.

If necessary, and when warranted, VCP plans to engage fully licensed testing facilities independent of the DBC's testing agencies to verify conformance with the construction documents. VCP can readily provide, through its QA Audit Consultant, the following shop inspection and laboratory testing services as needed:

- Shop Inspection Services
  - > Structural steel fabrication
  - > Prestressed/precast concrete fabrication
  - > Coating application
  - > Concrete pipe
- Laboratory Testing Services
  - > Portland cement concrete
  - > Portland cement
  - > Steel reinforcing
  - > Asphaltic cement concrete
  - > Soils and aggregate

## 2.7. CONSISTENT WITH FEDERAL AND STATE REGULATIONS

See paragraph 2.2 above. By reducing traffic congestion along the existing Route 460, and providing an efficiently designed 4-lane divided, limited-access facility on new alignment, the region will benefit from improved air quality. As indicated in the Draft Environmental Impact Statement, the project conforms to the State Implementation Plan and the goals set forth in the Clean Air Act Amendments

and the Final Conformity Rule. As further indicated in the DEIS, the predicted carbon monoxide concentrations for the candidate build alternatives (2026) are lower than that for the existing Route 460 (2003), and also lower than the No-Build Alternative (2026). In addition to our strong commitment to environmental protection during planning, design and construction, the team anticipates that improved flow of traffic on the new alignment will diminish congestion in the localities along existing Route 460, and result in an overall improvement of air quality. As previously indicated, our team is not aware of any inconsistencies with applicable state and federal statutes.

## 2.8. ALLOCATION OF RISK AND LIABILITY

The liabilities and risks clearly delineated in the Comprehensive Agreement will be maintained by each party to the CA. The project is expected to be completed on time and within budget by executing an "arms-length" design/build contract with appropriate incentives and penalties. Safe operation of the facility will be a requirement of the CA with measurements, benchmarks, and "hold points" established to review, assess, and validate required safety protocols.

As in all major construction projects and PPP facility programs, risk represents cost to one or another of the parties to the contract. In many cases, the risk is shifted largely to one party either by force of the contract or mutual agreement. The guiding factor should be that the risk is most easily borne by the party best able to control that risk. In order to save some very significant costs to this program, we are proposing that several of the tasks be performed, and the risk allocated to, VODT rather than to VCP. VCP is willing to perform these functions as required and as necessary, and will describe the savings to be achieved in the financial section of this conceptual proposal. We recommend that the following tasks and their associated risks be undertaken by VDOT:

- Acquisition of all ROW
- Obtaining all permits
- Guarantee of a fixed escalation rate for cement, steel, and fuel prices
- Provide an OCIP
- Require bonding of a maximum of \$200 million at any one time
- Assume all costs for local road disturbance (frontage / connector roads, design, ROW acquisition, construction)
- Provide a minimum guarantee of Port traffic increases
- Reduce procurement time to June 2007 (execute an Interim Agreement on that date)

In our efforts to make this project financially feasible, we offer this allocation of risk to be assumed by VDOT as a means of ensuring the project outcome.

## 2.9. ASSUMPTIONS

Our assumptions include:

- Start construction July, 2010
- Four year construction period

- Full compliance with the DEIS (for now) and the final EIS and ROD, when rendered
- Cement, petroleum, and steel will escalate at 5.5% per year
- Port traffic will grow commensurate with Port expansion
- No new competing, free roads will be constructed

## 2.10. PHASED OR PARTIAL OPENINGS

There will be no phased or partial openings or operation of this facility until completion, testing, training, and trial runs have been completed. We have, however, contemplated preparing, but not fully constructing some of the very low-traffic interchanges until a later date. This would achieve some cost savings and would reduce the construction schedule.

## 2.11. SCHEDULE AND PLAN TO MAINTAIN

VCP proposes to manage the Toll Road based on a whole-of-life approach. On all our operations and maintenance projects VCP also takes a whole-of-life approach and fundamental to this is the regular monitoring of asset condition, particularly of the pavements, and the optimization in terms of cost and time of major repair and replacement works.

As an example, for this Toll Road it is proposed to engage Pavement Management Services ("PMS") who are a well established provider of data collection and pavement management systems, based on the World Bank pavement deterioration model (HDM4). Transfield Services in conjunction with PMS has tailored each of our road maintenance contracts to the model. With this information we can reliably forecast the annual maintenance costs of each pavement asset.

This procedure has provided considerable extended life of pavements. It is simply based on the process of early intervention of defects, and this process has provided long term savings on our projects.

In conjunction with the Computerized Maintenance Management Systems ("CMMS") and Asset Management System, PMS generates a systematic approach to the process of managing pavements. PMS aims to extend the overall useful life of the asset through the development of a program of works that optimizes pavement performance and user benefits.

PMS will monitor the performance of the pavement typically includes the collection of the following data on an annual basis:

- Roughness
- Texture Depth
- Rutting
- Skid Resistance
- Surface Cracking

Based on the collection of this data, analysis on the expected remaining life of the asset along with a detailed life cycle analysis will yield an optimized asset management regime. In addition to the collection of the above data, it is also proposed to undertake localized testing of some imperfections on the road

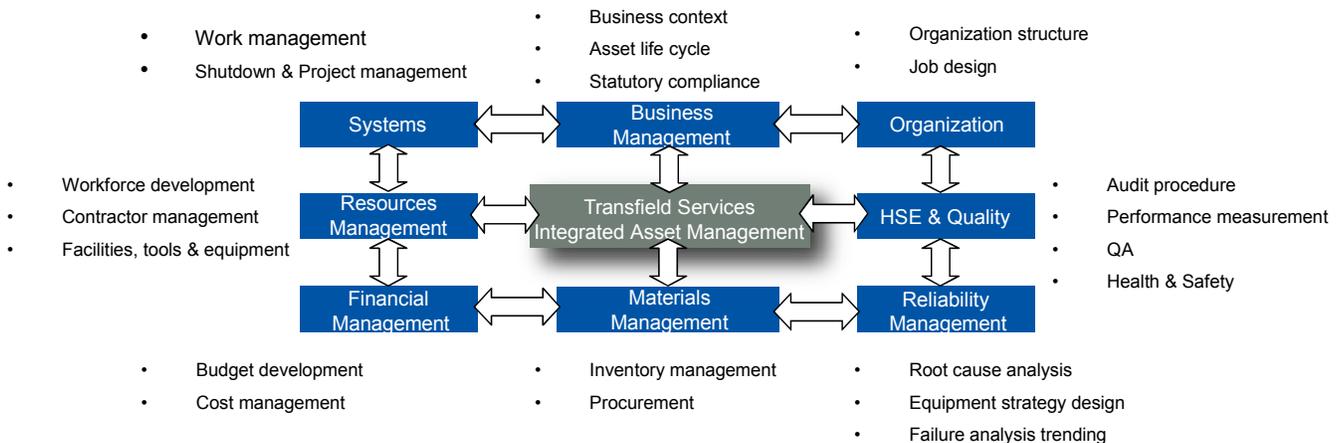
system. This process is referred to as crack mapping, which essentially tracks the progression of cracks and measures the rate of deterioration, to forecast any planned replacement.

### 2.11.1. Life-cycle costs optimization

In adopting a whole of life approach to Asset Management, VCP is able to reduce the life cycle maintenance costs whilst ensuring the long-term performance and reliability of the asset.

Overall, this is achieved through the performance monitoring and analysis of the asset against performance and cost standards. The Asset Management processes have been consolidated from our asset management experience into a series of best practice generic standards. These processes are used to establish a comprehensive Programmed Maintenance Plan. Best practice generic standards utilize a set of 22 key elements, which are grouped into eight categories as shown below. These eight major areas facilitate the identification of areas where improvements can be made for both the short and long term.

**FIGURE 2.1: LIFE CYCLE COSTS OPTIMIZATION**



### 2.11.2. Asset management and performance monitoring

The objectives of maintenance services will be to provide continuing and reliable operation of all equipment and assets on the Toll Road to optimize the performance of the Toll Road with minimum disturbance to the users and with minimal interruption to normal operations of various systems.

The general objectives of the VCP asset management approach will be as follows:

- Maintain and preserve the value of the existing assets
- Maintain and increase, where required, the serviceable life of the assets and minimize failure due to deterioration
- Provide and maintain a safe road environment with minimum disruption to road users
- Minimize loss of revenue due to down time of the Toll collection
- Maintain visual amenity of the Toll Road assets

- Be responsive to community needs and maintain good customer relations

In carrying out the works, Transfield Services, current advisor on operations and maintenance, will use state-of-the-art technology to ensure the most appropriate and cost effective solutions are implemented throughout the term of the project. Transfield Services will adopt technical advances as developed in other contracts, for example the use of global positioning systems ("GPS") to locate all Toll Road assets. This system provides collection of accurate data resulting in better measurement, better asset management and ultimately safer and more efficient road networks.

#### 2.11.2.1. Toll Road Maintenance

Transfield Services carries out routine maintenance and minor repairs to industry best practice standards, and comply with all Federal, State and Local Statutory requirements.

The maintenance standards and intervention levels to be observed are purpose-prepared for each project in accordance with a Code of Maintenance Standards, which recognizes all local and project specific requirements.

In addition, Transfield Services has developed a series of standards for the management of roads. Full details of a typical set of standards can be provided if required for review.

As part of their Asset Management System, Transfield Services utilizes CMMS. CMMS are used to assist in the management, co-ordination and control of Toll Road maintenance including:

- Maintenance planning
- Job allocation
- Site visits
- Reporting and Processing
- Costing
- Stores and spare parts inventory control

Transfield Services has developed a detailed inspection plan, which includes the procedure for inspection and planning for the execution of all identified defects that require remedial work. The works are prioritized according to safety and any influence that may cause inconvenience of the traveling public.

We have a fully developed Code of Maintenance Standards ("COMS") which can be modified to incorporate any requirements of VDOT, the standards identify at what level intervention is required, and within a specified response time, at all times issues that are safety related have a high priority. The work order management system we use has been developed around the COMS.

In addition to the COMS, we provide an annual assessment on the condition of each asset, and this can be used to provide the value of the assets, as we report as a percentage of the original value.