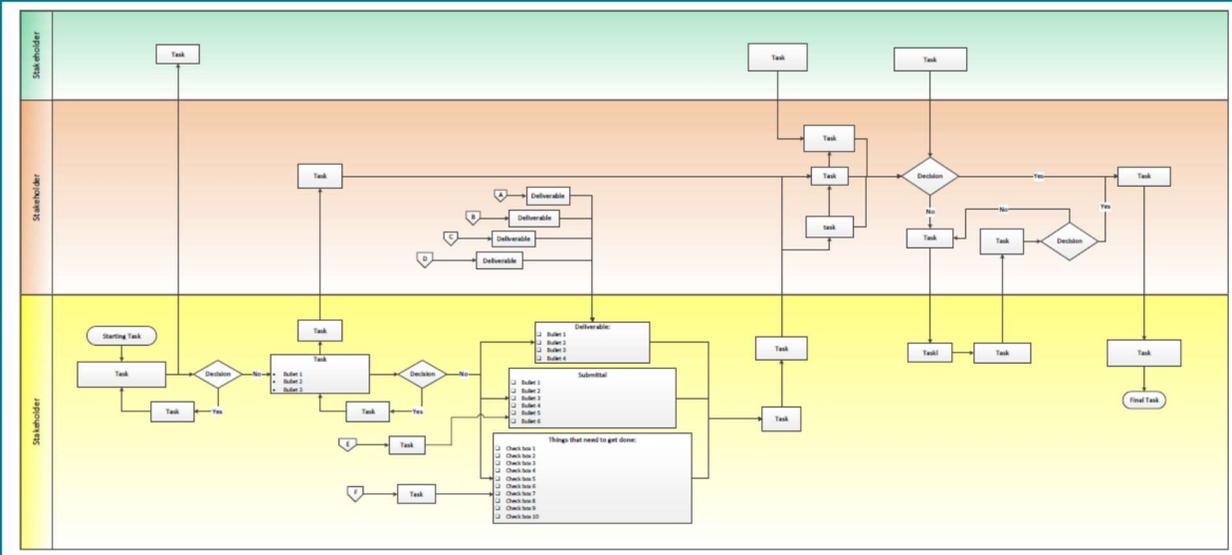


White Paper



Tool of Mass Deduction All on the Same Page (TOMD – ASP)™ What is it? How does it work?

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Executive Summary

For consulting fees of a few hundred hours, application of the Tool of Mass Deduction – All on the Same Page (TOMD – ASP)™ can save time, improve quality, enhance teamwork, while reducing disputes - claims resulting in hundreds of millions of dollars of savings for major projects. The benefit - cost ratio of TOMD – ASP™ is estimated at 2000+. To put this into perspective, a consulting fee of \$100 thousand can save over \$200 million on a large project.

As people or organizations, we get caught in an endless cycle of critical emergencies, putting out fires or dealing with one problem after another. We suffer from “problem blindness”¹ and start to believe that negative outcomes are inevitable and out of our control. Lack of ownership – it’s not my problem and having more important thing to do stop us from going “upstream”¹ to fix the systems that caused the problem in the first place.

The starting point for the delivery of Engineering Procurement Construction (EPC) contracts is the same, a large contract with many thousands of words, an inherent disconnect between contract developers and implementers, and a focus on “downstream” work. Given that a picture is worth a thousand words (aka pixels) missing from the contract is the big picture – how does it all fit together? This can be done – and it is called TOMD – ASP™ by combining the contract document, the project life cycle, and the organization structure into a process map flow chart.

TOMD – ASP™ is a three-step upstream methodology that solves problem blindness.

1. **Develop the TOMD – ASP™.** It is not easy – but through intellect, fortitude, attention to detail, and significant time, the result is a fundamental building block that displays who does what, when, where and how things get done.
2. **Generate the problem - opportunity pairs.** Viewing the project from a system perspective illuminates problems in the form of oversights, duplications and process issues that are lost in the thousands of words. Through mass deduction and compiling everything on one page each problem comes into focus and is transformed into an opportunity for improvement.
3. **Prioritize and implement the opportunities.** Each opportunity is evaluated on two parameters – ease of implementation and consequence. Though robust stakeholder dialogue, the TOMD – ASP™ is used to develop an action plan to implement each opportunity until it becomes a solution.

Three diverse examples of TOMD – ASP™ are discussed in detail with a subset of problem - opportunities pairs to illustrate the costs, benefits, and application of the TOMD – ASP™.

TOMD – ASP™ is applicable to all project delivery methods, can be tailored to individual or multiple clients – stakeholder groups, used for components or the entire contract, can focus on portions or the complete project life cycle, and can be applied to complex business contracts.

Building on our history of facilitating diverse groups towards a common goal, e-VANS Corporation invented TOMD – ASP™ and welcomes the opportunity to work with associates, partners, owners, agencies, consultants, contractors, lenders, financiers, clients, and other stakeholders to apply TOMD – ASP™ on your next project.



Problem Statement

There is room for improvement in the development – delivery of EPC contracts for reasons outlined in Appendix A – Prologue (required background reading). Upon completion of the contract development phase the outcome is the same, a large contract – many pages – thousands of words, with oversight of the big picture and an inherent disconnect between contract developers and implementers. This creates a source for future problems during the delivery of the project.

Time and money become scarce as stakeholders focuses their efforts on completing the project. We become immersed in a self-propagating cycle of downstream work (reference “Upstream” by Dan Heath)¹ reacting to emergencies or putting out fires. We deal with one problem after another, but never get a chance to use “upstream thinking” to fix the systems the that caused the problems in the first place. The three barriers that keep us downstream are.

1. Problem blindness – When we don’t see a problem, we can’t fix it and start to believe that negative outcomes are inevitable and out of our control.
2. Lack of ownership - That problem is not mine to fix.
3. Tunneling - I can’t deal with that right now, there are more important things to do. We adopt tunnel vision and never get back to fixing the root cause of the problem.

Using TOMD – ASP™ solves the first barrier – problem blindness – that starts us on the path to opportunities, solutions, and better project delivery.

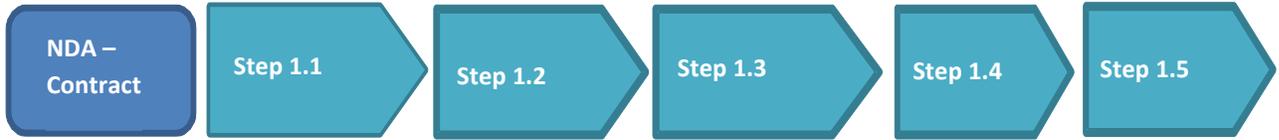
As engineers we develop work packages that have both drawings and specifications. The drawings are the pictures, and the specifications are the words (analogous to pixels). From a practical perspective the drawings tell us how it all fits together while the specifications are necessary support information. For an EPC contract it is the other way around. The words are paramount – they have legal precedence - and there is no picture showing how it all fits together. If we had to issue a work package without the drawings, it would be massive, imprecise, and subject to numerous interpretations. Yet, engineers (or project managers) typically deliver projects based on a contract document that consists entirely of words (aka pixels). It is impractical to put something together from words alone in the same way that an engineer would not issue a work package without the drawings. If a picture is worth a thousand words - why don’t we have a picture for a contract? We do, and it is called TOMD – ASP™.

Definition

TOMD – ASP™ is an upstream problem-solving methodology to improve the development and delivery of contract documents. The three steps for TOMD – ASP™ are.

1. Develop the TOMD – ASP™
2. Generate the problem - opportunity pairs (POP).
3. Prioritize and implement the opportunities.

The following diagram illustrates the three steps of TOMD – ASP™.



Step 1 - Develop TOMD – ASP™



Step 2 – Generate the Problem - Opportunity Pairs



Step 3 - Prioritize and Implement



How it Works

Step 1 – Develop TOMD – ASP™

Prerequisite to engagement a non-disclosure Agreement (NDA) is established with the client and / or stakeholder group. The first task is to source the project contract documents, including but not limited to all relevant contracts, subcontracts, project agreements, interface agreements, schedules, appendices, and other contract support information. As background information, it is helpful to have business cases, project charters, project plans, value for money assessments and other relevant project planning documents.

Starting with the executed contract documents – we overlay the project organization structure with the project life cycle to develop the TOMD – ASP™. As a caveat, this is not easy – it requires intellect, attention to detail, fortitude, process workflow understanding, contract interpretation proficiency, engineering or legal experience, project management competency, systems engineering knowledge, business acumen and a significant amount of time (a minimum of 100 hours).

Depending on the project delivery methodology the stakeholders can include – but are not limited to - the owner agency, engineers, architect, design professionals, consultants, construction contractors, sub-contractors, partnership(s), joint ventures, financiers, lenders, independent agents, and third parties. e-VANS Corporation then employs our intellectual property to translate the contract document into the fundamental building block called TOMD – ASP™. Going forward, our intention is to share the process to develop the TOMD – ASP™ with our partners, associates, clients, and stakeholders as we develop individual TOMD – ASP™ on a project or contract basis.

Three examples of completed TOMD – ASP™ are provided in the Appendix and discussed throughout the remainder of this white paper.

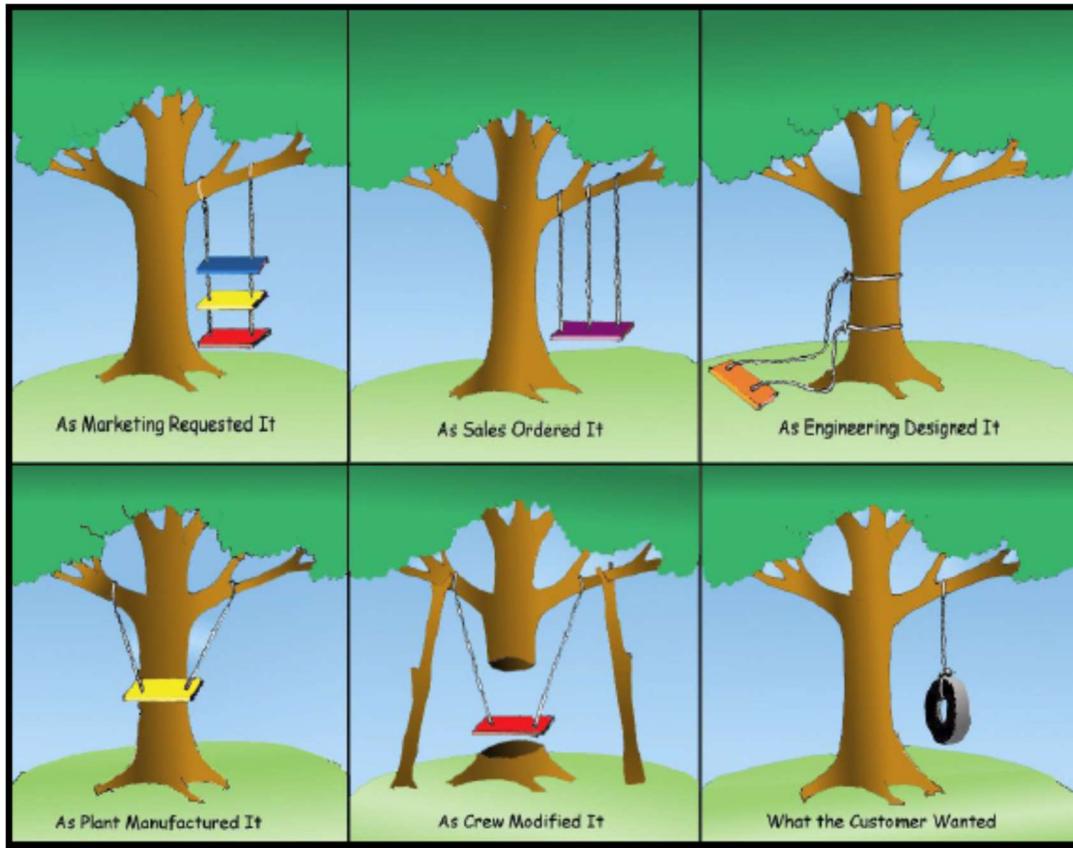
Step 2 – Generate the Problem - Opportunity Pair

The exercise of interpreting the contract documents into TOMD – ASP™ discloses process issues, gaps, duplications, overlaps, and brings to light misaligned contract interpretations that are listed as potential problems. Analyzing the outcome for each problem leads to an opportunity for improvement within the context of the project. These problem - opportunity pairs are then listed in a register that can include, but is not limited to terminology, governance, roles & responsibilities, payment mechanism, submittals, schedule, milestones, deliverables, completion certificates (design / construction / commissioning / safety), systems integration, testing, commissioning, turn-over, operations, maintenance, etc. The problem - opportunity register is the catalyst for upcoming improvements.

What it shows

The TOMD – ASP™ shows - who does what, when, where and how things get done. It shows “what” the contract asks for. What the source agency wants may differ from what the contract requests. What the construction contractor can or will provide is based on their interpretation of the contract document. It has often been said to be careful what you ask for because that is

what you will get. The following picture shows the problem when each stakeholder has a different interpretation of the contract.

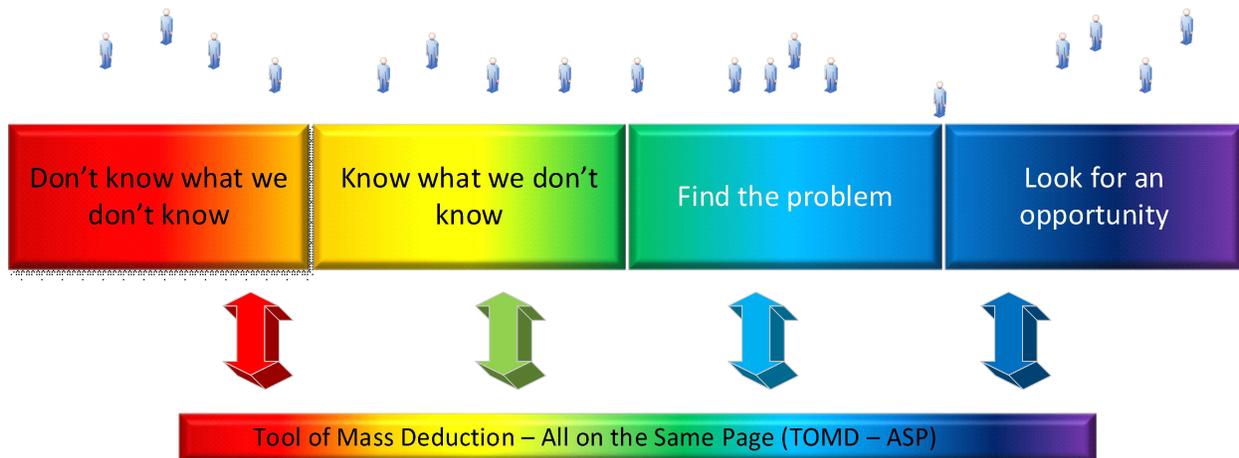


Using different stakeholder viewpoints, the TOMD – ASP™ eliminates problem blindness – leading the stakeholders upstream to opportunities and eventually solutions.

What is missing?

Exhaustive analysis with the TOMD – ASP™ reveals oversights in the original contract document. Utilizing project specific knowledge exposes gaps in comparison to best practices within the industry. Despite the best intentions of the contract authors (and the construction team) there are items that are missed without seeing the big picture.

You cannot fix what you cannot see. This is where TOMD – ASP™ helps – it is the catalyst that shows and connects the problems – opportunity pairs along the knowledge spectrum as illustrated by the following graphic.



Individuals, groups, and stakeholders tend to form knowledge clusters that are stopped by the gaps along the knowledge spectrum. The power of TOMD – ASP™ is that it resolves problem blindness, then acts as a common denominator linking the problem to expertise that can help. Understanding the problem, combined with project teamwork, ultimately leads to the solution.

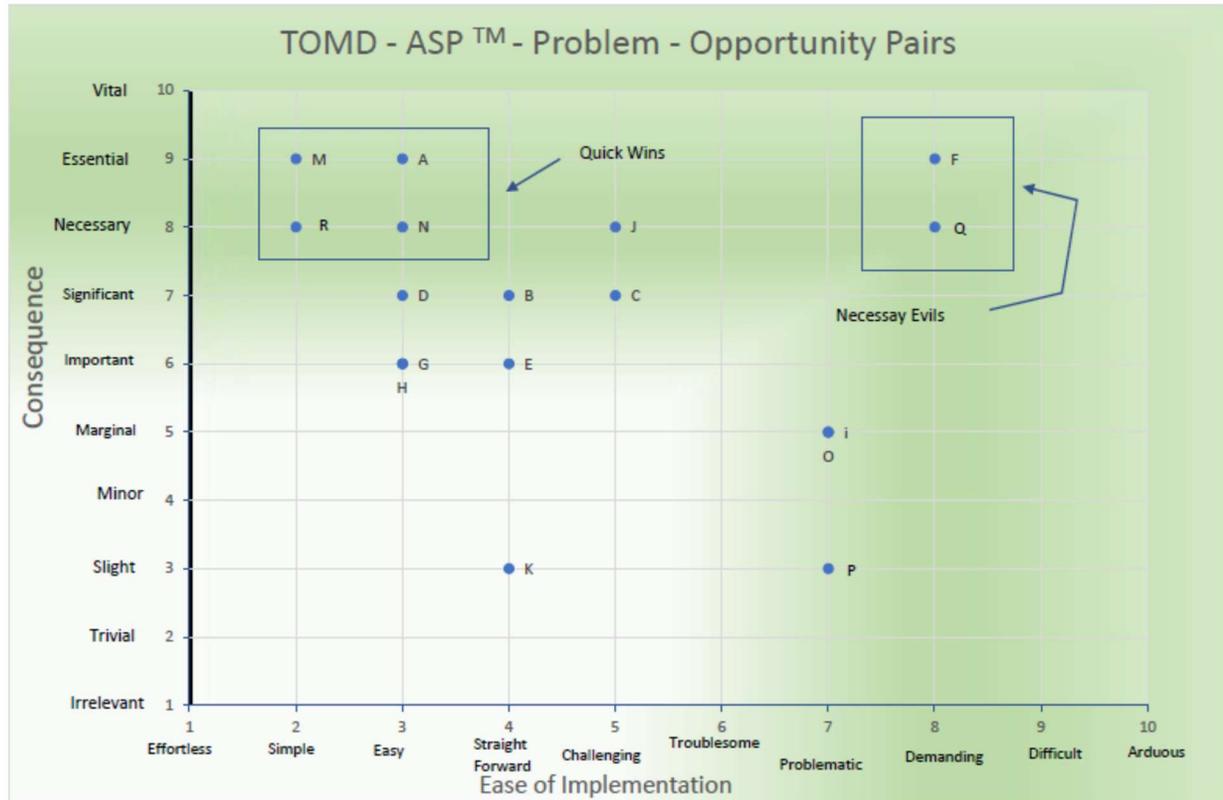
Mass Deduction – All on the Same Page

The unique novel perspective of TOMD – ASP™ enables the mass deduction of the contract documents from a process or system perspective. Showing the entire contract graphically on one page is fundamental to engage and maintain communication between stakeholders. Although stakeholders tend to focus on the activities within their swim lane, the TOMD – ASP™ enables stakeholders to look outside their boundaries to understand how they interface with others and contribute to the overall success of the project. The TOMD – ASP™ reduces barriers and enhances teamwork between all stakeholders. Using mass deduction ensures completeness, continuity, and context.

Step 3 – Prioritize and Implement Opportunities

Each opportunity is evaluated on a scale of 1 to 10 and plotted on two axes – ease of implementation and consequence. On the ease of implementation scale, 1 represents effortless while 10 is arduous – see glossary for increments on the scale. On the consequence scale 1 represents irrelevant while 10 represents critical / vital to the project success – see glossary for increments on the scale. The goal is to find easy to implement (quick win) opportunities that are significant to project success. In the same manner there may be some opportunities that are critical to project success that must be implemented despite the high degree of difficulty (necessary evils).

The following graphic shows the problem – opportunity pairs discussed in three forthcoming TOMD – ASP™ examples.



The TOMD – ASP™ and opportunity register are provided in report format to the client (and relevant stakeholder group) for review and comment. Typically, this will lead to a robust dialogue with stakeholders facilitated in a workshop environment. The discussions / workshops can focus on individual or multiple opportunities involving few or many stakeholders. Some opportunities will be self evident while others will require significant resources, time, and effort to build agreement amongst stakeholders. Reaching resolution can range from straightforward agreement, to negotiated dialogue, to facilitated workshops, to mediation techniques, to value engineering analysis. TOMD – ASP™ is the building block used to consult with the client - stakeholder group to plan each opportunity. The final step is for the project team to execute the action plan for each opportunity in order of priority.

Examples

The following three examples of TOMD – ASP™ were applied to clients of e-VANS Corporation. The subset of problem - opportunities pairs illustrate the costs, benefits, and application of the TOMD – ASP™ across a range of project environments. As the primary objective of this white paper is to transfer knowledge, specific task information has been redacted to protect client sensitive information.

Example 1

TOMD – ASP™ was applied to a project component at the end of the construction phase of a major Public Private Partnership (P3) infrastructure project. The capital cost was multiple



billions of Canadian dollars. Overall cost of this TOMD – ASP™ engagement was approximately 100 hours (within other consulting services) with a potential benefit of over \$204 million. The TOMD – ASP™ is graphically illustrated in Appendix B.

The TOMD – ASP™ exposed a problem and solution with critical decision processes; duplications, overlaps and difficulties with sign off processes; deliverable ambiguities; misaligned responsibilities for approval documents; insufficient information to make key decisions; and other problems. All the problems (and one solution) are structural in nature, are not apparent from the wording in the contract document and could have been avoided if TOMD – ASP™ was used.

The following table summarizes the benefits, costs, ease of implementation, and consequence for each problem - opportunity pair, with the details provided in Appendix B.

POP	Problem / Opportunity / Ease of Implementation - Consequence	Benefit	Cost
A	Problem - Large volume of support information with insufficient time to make critical decisions	\$30 M	16 hr
	Opportunity - Stakeholder to provide decision making information in advance		
	Easy to implement and essential to project success. Quick win.		
B	No problem	\$20 M	14 hr
	Opportunity - Advance insight of the decision-making information		
	Straight forward to implement and necessary for project success. Recommend stakeholder workshop with written confirmation and contract amendment.		
C	Problem - Duplications, overlaps and unclear sign off process	\$12 M	20 hr
	Opportunity - Remove duplications - clarify roles & responsibilities for deliverables.		
	Challenging to implement and significant consequence for project success. Recommend workshop supported by written confirmation and contract amendment. If opportunity not implemented animosity between stakeholders and omissions of deliverables.		
D	Problem – Deliverable Ambiguities	\$20 M	20 hr



POP	Problem / Opportunity / Ease of Implementation - Consequence	Benefit	Cost
	Opportunity - Eliminate specific requirements - changing requirements to appropriate timeframe		
	Easy to implement and significant consequence for project success. Aligns requirements with appropriate timeframe. Closes a loophole that could increase animosity, delay, and project costs.		
E	Problem - non responsible parties execute approval documents	\$10 M	10 hr
	Opportunity - Align the signatures on approval certificates with responsible parties and distribute the documents to others FYI		
	Straight forward to implement and important for project success. Relatively easy to implement with a dialogue – workshop to align stakeholder expectations followed by amendment to contract. Closes a loophole that prevents project interruption		
F	Problem - Stakeholder lacks valuable information to provide direction for key decisions	\$12 M	20 hr
	Opportunity - Definition of information workflow to specific stakeholders		
	Demanding to implement and essential for project success. Recommend workshop with written confirmation and contract amendment.		
G	Other opportunities not disclosed or available in complete project life cycle TOMD – ASP TM	\$100 M	60 hr
	Total	\$204 M	160 hr
	Benefit / Cost Ratio	3000 +	

For a cost of approximately 160 hours of consulting fees the TOMD – ASP TM provides a potential benefit of over \$204 million with a benefit / cost ratio of over 3000. Note that this example only considers the component of the project life cycle at the end of the construction phase. Application of a similar TOMD – ASP TM for earlier or later in the project life cycle would uncover other problems – opportunities with an additional benefit of \$100 million. This project was not completed at the time of publishing the white paper.

Example 2



TOMD – ASP™ was applied to a procurement – application process to review and approve grant funding to support business opportunities between applied research and technical start up. The program is focused on an advanced technical area and is administered by academia with links to industry. The scale – scope of the program was to provide financial support for prototype development over a one – year timeframe. The TOMD – ASP™ extended to execution and controls for existing grants – not illustrated here. Overall cost of this TOMD – ASP™ engagement was 80 hours of consulting fees with a net benefit of \$450 thousand. The TOMD – ASP™ is graphically illustrated in Appendix C.

Overall, the process was too complex and confusing, required simplification with automated tools and instructions, had non-contributing stakeholders, suffered from excessive midstream approvals, neglected the benefits of early industry involvement, and omitted the responsible stakeholder for final approval. Despite the best intentions of the founding project sponsors, none of these problems were known until the TOMD – ASP™ was completed. The following table summarizes the benefits, costs, ease of implementation, and consequence for project success for each problem - opportunity pair with details provided in Appendix C.

POP	Problem / Opportunity / Ease of Implementation - Consequence	Benefit	Cost
H	Problem - Stakeholders that do not contribute to the process.	\$100 K	12 hr
	Opportunity - Reduce roles – add resources - consolidate documents and approvals		
	Easy to implement and important for process improvement.		
I	Problem - Too many stakeholder approvals - unnecessary steps - reviewing stakeholder was not a signatory leading to an accountability gap – inappropriate timing of industry support eroded transparency and trust	\$100 K	15 hr
	Opportunity - Focus on final approval - include the reviewing stakeholder - engage industry earlier		
	Problematic to implement and marginal for process improvement. Highly political with transfer of authority from academia to industry. Mostly administrative change.		
J	Problem - No mechanism to manage the interval between cycles – Poor quality applications	\$100 K	20 hr
	Opportunity - Simplifying & automating the application process, Instructional seminars - market sounding		
	Challenging to implement and essential for process success. Required workflow improvement, software - webpage tools, additional time with applicants and the marketplace. Proximity		



POP	Problem / Opportunity / Ease of Implementation - Consequence	Benefit	Cost
	to applicants and industry helped to manage the interval between cycles		
K	Problem - Insufficient resources for project controls and monitoring.	\$50 K	15 hr
	Opportunity - Implement a deliverable monitoring and invoice support system		
	Straight forward to implement with a slight process improvement consequence. Provided better oversight and financial control but had less impact on the effectiveness of the individual project.		
L	Other opportunities not disclosed	\$100 K	30hr
	Total	\$450 K	92 hr
	Benefit / Cost Ratio	20 +	

This example shows that TOMD – ASP™ is applicable to a procurement environment for smaller semi repetitive project cycles. For a cost of approximately 90 hours of consulting fees the TOMD – ASP™ provides a potential benefit of over \$450 thousand. Note that the smaller scale of project cycle means that costs are higher relative to benefits, however, the TOMD – ASP™ is worth the effort with a net benefit – cost ratio of 20+. Although the agency implemented many of the recommended opportunities the history of previous problems combined with departure of the program director led to the termination of the program two years after the TOMD – ASP™ analysis was completed.

Example 3

TOMD – ASP™ was applied to a major P3 infrastructure project. The capital cost was multiple billions of Canadian dollars. Two TOMD – ASP™ were developed to understand the project agreement. The first TOMD – ASP™ is a contextual high-level view of the project life cycle while the second TOMD – ASP™ focuses on the conclusion of the construction phase. Overall cost of this TOMD – ASP™ engagement was approximately 60 hours (as a component of other consulting services) with a net benefit of over \$126 million. Both TOMD – ASP™ are illustrated in Appendix D.

While building the TOMD – ASP™ it became apparent that many of the definitions, terms, and procedures were inadequately defined. Oversight of the database requirement was a problem that fortuitously did not have serious consequences. The governance process(es) lacked foresight from a scope perspective. Poorly defined timeframes – deliverables for the mid-project planning document were not apparent in the contract. Overall, the application of TOMD – ASP™ caught many oversights that the contract authors were not aware of. The following table



summarizes the benefits, costs, ease of implementation, and consequence for each problem - opportunity pair with the details provided in Appendix D.

POP	Problem / Opportunity / Ease of Implementation - Consequence	Benefit	Cost
M	Problem - undefined and inconsistent terms - not aligned with industry practice	\$30 M	10 hr
	Opportunity - define all terms, use them consistently, and align terminology with industry practice		
	Simple to implement and essential for project success. Quick win. Requires agreement on terminology then amendments to the contract document.		
N	Problem - interrelated procedures are not defined	\$20 M	14 hr
	Opportunity - align procedural terms within the contract document(s)		
	Easy to implement and necessary for project success. Quick Win. Requires consensus followed by amendment to contract. Proactive resolution would have avoided a dispute.		
O	Problem - Gap in governance	\$4 M	6 hr
	Opportunity - Re-aligning the steering committee mandates - enable sub-committees – enable steering committees to set their terms of reference		
	Problematic to implement with marginal consequence to project success. Requires changes to steering committee terms entrenched in the project agreement. Closes a loophole that may not be resolved by pragmatic stakeholders.		
P	Problem – Gap in governance scope	TBD	4 hr
	Opportunity - Discuss governance scope with stakeholders		
	Problematic to implement with slight consequence to project success. First determine if oversight is intentional – covered by others. May require changes to project agreement that closes a loophole.		
Q	Problem - Timeframe not defined - deliverables inappropriately sequenced or not completed	\$12 M	10 hr
	Opportunity - Define a deadline – reallocate deliverables		



POP	Problem / Opportunity / Ease of Implementation - Consequence	Benefit	Cost
	Demanding to implement while necessary for project success. Should be done based on high consequence. Requires structural changes to mid-project deliverables - approval cycles. Needs workshops or value engineering. Will resolve communication issues that could delay the project.		
R	Problem – Database not required	\$5 M	6 hr
	Opportunity - Include the database requirement in contract.		
	Simple to implement while necessary for project success. Quick win. Requires amendments to the contract document. Pragmatic approach avoided significant project distress.		
S	Other opportunities not disclosed	\$100 M	60 hr
	Total	\$186 M + TBD	118 hr
	Benefit / Cost Ratio	3100 +	

Many of the problems in Example 3 could have been avoided by applying the structured approach from the TOMD – ASP™. Note that this example only considers the component of the project life cycle at the end of the construction phase. Application of a similar TOMD – ASP™ for earlier or later in the project life cycle would uncover other problems – opportunities with an additional benefit of \$100 million. For a cost of approximately 118 hours of consulting fees the TOMD – ASP™ provides a potential benefit of over \$186 million with a benefit / cost ratio of 3100+. This project was not completed at the time of publishing the white paper.

Benefits

The following tables summarizes the benefit – cost for each example.

Example	Benefit	Cost	Comment
1	\$204 M	160 hr	Benefit / Cost = 3000+. Quick win opportunity to provide decision making information. Challenging opportunities to remove duplications, clarify roles – responsibilities, and resolve ambiguities are worth the effort with overall benefit of \$82 million. Straightforward opportunity to align signature on approval certificates. Demanding opportunity to provide supporting information to stakeholder necessary for project success. Other opportunities available.



Example	Benefit	Cost	Comment
2	\$450 K	92 hr	Benefit / Cost = 20+. Smaller project(s) in a procurement environment with significant benefit / cost. Easy opportunity to consolidate documents and approvals while adding resources to specific roles. Problematic opportunity to engage industry and focus on final approvals. Challenging opportunity automate the application process and reach marketplace. Straightforward opportunity to monitor deliverables.
3	\$186 M	118 hr	Benefit / Cost = 3100. Quick win opportunities to define terminology, include database requirement and align procedures. Problematic opportunities to resolve governance scope. Demanding opportunity to define timing of deliverables. Other opportunities available.
Total	\$390.45 M	370 hr	Average Benefit / Cost = 2000 +.

The benefits for applying TOMD – ASP™ from these examples include support information and advance insight for critical decisions; clarification of roles / responsibilities; removal of duplications and overlap; clarification of deliverable ambiguities; positioning deliverable timeframes; purging unnecessary requirements; aligning signatory with authority on approval documents; defining workflow for stakeholders; eliminating unnecessary roles; adding resources were needed; consolidating document approvals; improving engagement with marketplace / market sounding; automating processes; monitoring deliverables; clear terminology consistent with industry practice; consistent contract procedures; well-defined governance scope; and constant database requirements.

The examples uncovered over 16 problem – opportunity pairs that were not visible before application of TOMD – ASP™ plus many other benefits not illustrated for brevity – readability, and to focus on transferring knowledge without disclosing client sensitive information. Noting that two of the examples were not for the entire project life cycle and extrapolating these results beyond this small sample size indicates there is significant room for improvement in the delivery of EPC projects. There are likely many other problems - not evident in the examples - that could be resolved by the application of the TOMD – ASP™ over the entire project life cycle.

For consulting fees of one hundred thousand dollars, application of the TOMD – ASP™ can save time, improve quality, enhance teamwork, while reducing disputes - claims resulting in hundreds of millions of dollars of savings for both minor and major-projects. The benefit / cost ratio of TOMD – ASP™ is conservatively estimated at 2000+.

Application of TOMD – ASP™

TOMD – ASP™ is applicable to all EPC project delivery methods, Traditional (Design – Bid – Build), Design – Build, Construction Management, Public – Private – Partnerships (PPP or P3), Integrated Project Delivery, and Alliance Model. The greater the complexity of the contract in



terms of stakeholders, roles – responsibilities, interface agreements, relationships, and project duration, the greater the benefit of using TOMD – ASP™ to understand who does what, when, where, and how.

Uncovering and agreeing on problem areas early can save money and make for a smoother project delivery. TOMD – ASP™ derives the most benefit from earlier application during the project life cycle. One approach would be to use TOMD – ASP™ after drafting the contract but before starting the project. This would require feedback workshops with the stakeholders – agreements – possible contract amendments – before moving onto a trouble-free project delivery with mutually agreed solutions in place. TOMD – ASP™ can be applied at any time during the project life cycle - it is never too late. Another approach would be to use TOMD – ASP™ mid-project for root cause analysis in support of conflict or dispute resolution. Although of least benefit for the project, a post-mortem TOMD – ASP™ could provide valuable lessons learned for future projects.

The advantages of TOMD – ASP™ can be applied to individual or multiple stakeholders including but not be limited to the owner agency, engineers, architect, design professionals, general contractors, construction team, sub-contractors, partnership(s), joint ventures, financiers, lenders, independent agents, operator, maintainer, or third parties. During the third step – prioritizing and implementing opportunities - single, multiple, or comprehensive stakeholders are engaged though many forms of dialogue, meetings, workshops, mediated solutions, and value engineering sessions.

TOMD – ASP™ can be applied to components of the contract including but not limited to definitions - terminology, roles & responsibilities, process flow, governance, steering committees, communication protocols, approval documents, requirements, deliverables, completion certificates (design / construction / commissioning / safety), procedures, workflow, schedule, timeframe, sequencing, milestones, deadlines, budget, project monitoring - controls, risk management, document control, quality control, information systems, payment mechanism, and submittals to name a few.

If required, TOMD – ASP™ can be applied to any or all portions of the project life cycle including but not limited to, administration, procurement, design, construction, installation, project management - delivery, systems integration, testing, commissioning, turn-over, operations, maintenance, project closure, and lessons learned. Within a P3 environment, TOMD – ASP™ can be used for business case development, market sounding, value for money assessment, phased procurement, commercial closure, financial closure, and risk allocation – transfer plus the other project phases mentioned previously.

TOMD – ASP™ is most effective when applied to the entire contract over the project life cycle. It is always best to start TOMD – ASP™ at a higher level and then focus on specific components of the contract, project life cycle or other needs related to the opportunity at hand. For focused TOMD – ASP™ the recommended best practice is to exceed to the scope boundaries to incorporate valuable context. It is not recommended to use TOMD – ASP™ for hands-on day-to-day activities that are best left resolved by the people doing the work. TOMD –



ASP™ is best applied to “team” opportunities solved at the management, project director, sponsor, and agency – stakeholders level.

TOMD – ASP™ is not limited to the EPC environment and can be applied to any business contract. The greater the complexity, words, terms, conditions, and clauses within the contract, the greater the benefit from TOMD – ASP™ in clarifying the roles of contract parties, understanding contract processes, and performing the requirements of the contract.

Summary - Conclusions

The starting point for an Engineering Procurement Construction (EPC) contracts is the same, a large contract, thousands of words (analogous to pixels) with an inherent disconnect between contract developers and implementers. Missing from the contract is the big picture – how does it all fit together? Combining the words (pixels) into the big picture can be done with the Tool of Mass Deduction – All on the Same Page (TOMD – ASP)™. This is difficult, but it can be done by combining the contract document with the project life cycle and the organization structure into a process map flow chart. TOMD – ASP™ shows the big picture - who does what and how things get done – that was lost in the thousands of contract words.

The three examples uncovered over 16 problem – opportunity pairs that were not visible before application of TOMD – ASP™. Although two of the examples did not cover the entire project life cycle the disclosed problems included duplications, oversights, roles / responsibilities, deliverables, requirements, approval documents, workflow, process automation, terminology, procedures, governance, database requirements to name a few. Extrapolating these results indicates there is significant room for improvement in the delivery of EPC projects that could resolved with the application of the TOMD – ASP™.

TOMD – ASP™ works by resolving problem blindness, leading to opportunities that improve the project delivery - saving time, improving quality, enhancing teamwork, and reducing disputes - claims. TOMD – ASP™ is applicable to all project delivery methods, can be tailored to individual or multiple clients – stakeholder groups, used for components or the entire contract, and focus on portions or the complete project life cycle. TOMD – ASP™ can save projects hundreds of millions of dollars and achieve a benefit / cost ratio of over 2000+.

Recommendations

Owners, agencies, consultants, general contractors, lenders, financiers, and other stakeholders should apply TOMD – ASP™ to their projects.

TOMD – ASP™ is the intellectual property of e-VANS Corporation invented through upstream thinking during the pandemic circumstances of 2020. Over the last 17 years, e-VANS Corporation has gained multiple perspectives by working with engineering firms, the construction industry, consultants, agencies, and businesses in both the private and public sector. Building on our history of facilitating diverse groups towards a common goal, e-VANS Corporation welcomes the opportunity to improve your next project with the application of TOMD – ASP™.



e-VANS Corporation will be holding a series of seminars explain and share our experience with TOMD – ASP TM. Please visit our website at www.e-vans.ca or contact us at contact@e-vans.ca for additional information. Your questions or comments are always welcome.

This white paper is available on the e-VANS Corporation website at.

<** insert link here>



About e-VANS Corporation

e-VANS Corporation Ltd. (e-VANS) is a vibrant engineering and project management company based in Edmonton, Alberta, Canada providing services throughout North America. The company was established in 2004 to manage the expanding consulting opportunities presented to the founder, Gary Evans, M. Sc., MBA, P. Eng., PMP, VMA, CP³P. Building on Gary Evans's professional experience, e-VANS has grown to as many as eight full time employees offering services in five main lines of business: project management, management consulting, value engineering, transportation engineering and most recently application of the TOMD – ASP™.

Vision

At e-VANS our vision is embedded in our name. We purposely start with a lower-case “e” to symbolize welcoming our clients with our friendly, cooperative approach. This letter has multiple meanings: ethical / earth / equality / electronic / efficient / effective / environment / engineering. The remaining letters, **VANS**, represent our corporate delivery model—we provide **V**alue **A**dded **N**avigational **S**ervices across the business spectrum. All four letters are capitalized for emphasis but carry equal significance. **V**alue is the core service that we **A**dd to our clients with leading-edge concepts and inventions. **N**avigation implies a long-term journey using metrics to guide our clients from where they are at to their destination. **S**ervice is the glue that holds it all together—we are in business to help our clients achieve their goals.

History

During the seminal first six years e-VANS focused on providing senior project management services on large infrastructure projects. Our first two years were consumed with the design - construction of high voltage power distribution systems in the Alberta Oil Sands. This was followed by project management services for the Edmonton's South LRT in 2006, where we managed the master schedule, design – construction - installation of stations, maintenance facility, power - communications systems and concluded with the testing - commissioning - turnover of all operating systems. In 2010 we expanded to accommodate new employees and associates allowing us to provide **VANS** to the following projects.

- Business Process Re-engineering (BPR) for a technology-funding program between academia and industry
- Project managers for the design and construction of a 90-suite apartment complex. \$40 million capital.
- Value engineering for a Steam Assisted Gravity Drain (SAGD) project in the Alberta Oil Sands. \$5.4 billion capital.



- Project managers for the five-year academic plan
- Completed a series of BPR initiatives for billing, accounting, dispatch, IT, and operational processes for an oilfield service company.
- In response to the largest natural disaster in Canadian history – the 2013 Calgary floods, e-VANS Corporation was the prime consultant for the design - construction of six temporary neighborhoods (housing 10,000 people) and reconstruction of two First Nation communities. \$500 million capital.
- Commissioning and testing of a rail transit project. \$800 million capital.
- Support the implementation of a Value Analysis Program at a public agency.
- Technical – program consulting services to prequalify for the replacement of train signal system for an international rail transit project. \$500 million capital.
- Commissioning Manager for a rail transit project. \$1.8 billion capital
- Value Engineering study of highway grade separation. \$240 million capital.
- Commissioning support services for a rail transit project. \$5.2 billion capital

e-VANS Corporation is registered with the Association of Professional Engineers and Geoscientists of Alberta (APEGA) to practice engineering in Alberta.



GLOSSARY

Acronym Dictionary

AKA	Also Known As
DBFOM	Design Build Finance Operate Maintain
EPC	Engineering Procurement Construction
FYI	For Your Information
GMP	Guaranteed Maximum Price
JV	Joint Venture
LRT	Light Rail Transit
e-VANS	The lower- case e has multiple meanings: ethical / earth / equality / electronic / efficient / effective / environment / engineering. The remaining letters, VANS , represent Value Added Navigational Services .
NDA	Non-Disclosure Agreement
POP	Problem Opportunity Pair
PPP or P3	Public Private Partnership
SPV	Special Purpose Vehicle (in the context of a Joint Venture)
TOMD – ASP TM	Tool of Mass Deduction – All on the Same Page TM

Opportunity Evaluation Scales

Ease of Implementation	
1	Effortless
2	Simple
3	Easy
4	Straight Forward
5	Challenging
6	Troublesome
7	Problematic
8	Demanding
9	Difficult
10	Arduous

Consequence	
1	Irrelevant
2	Trivial
3	Slight
4	Minor
5	Marginal
6	Important
7	Significant
8	Necessary
9	Essential
10	Vital - Critical

APPENDIX A: PROLOGUE

As background information the forthcoming paragraphs set the context for application of the TOMD – ASP™.

Project Delivery Methodologies

Engineering Procurement Construction (EPC) contracts require – at a minimum - an owner, a designer, and a construction contractor, to deliver an infrastructure project. There are six different project delivery methodologies to plan, design and construct an EPC contract as represented on the following spectrum.



Traditional (Design – Bid – Build)

Traditional or Design-Bid-Build is the longest standing project delivery method. On design-bid-build jobs, the owner contracts separately with a designer and a construction contractor. Once the designer completes the design documents, the owner then commences a procurement process to find the lowest price construction contractor to perform the work. The owner administers the contract while the designer ensures the construction contractor builds the infrastructure according to specifications. Upon completion of construction the owner takes over the infrastructure.

Design – Build

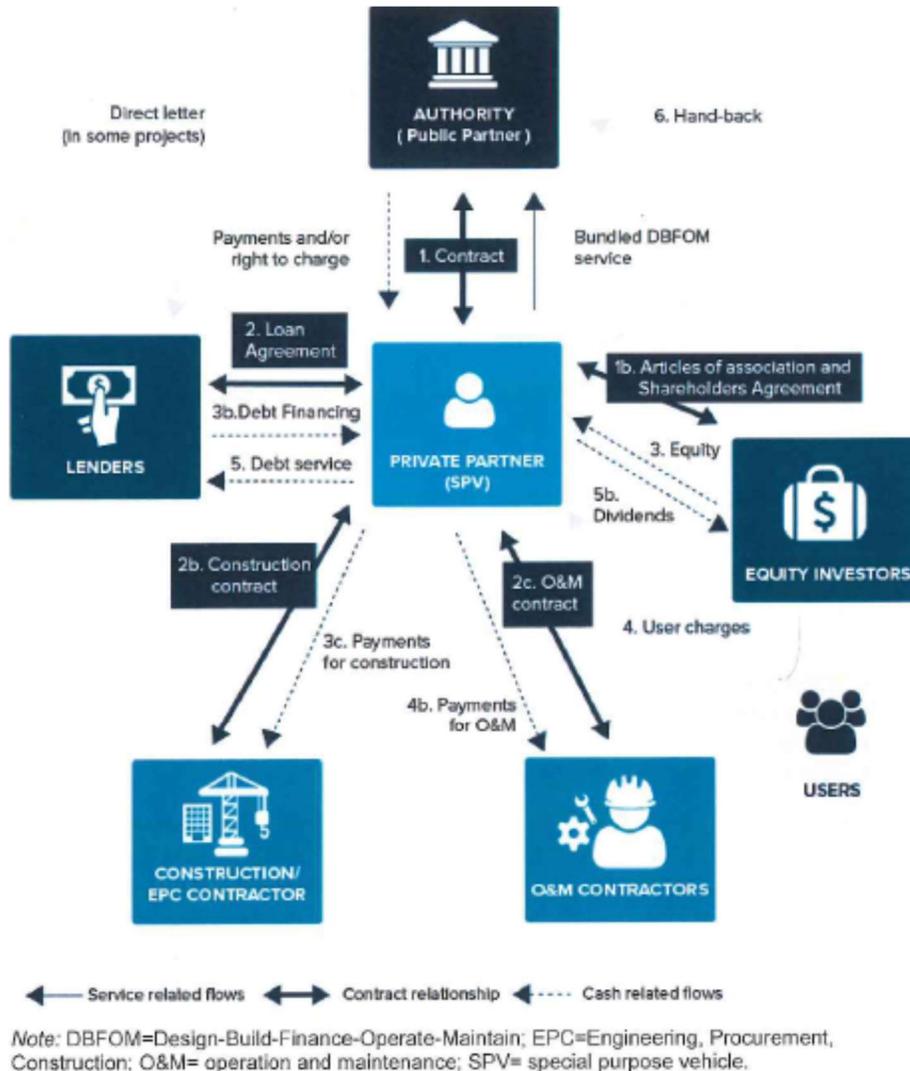
In a design-build project, the owner hires a design-build entity – a single company or a designer and construction contractor working together - to deliver the project from start to finish. If the design-build entity is multiple companies, it is important to establish the working relationship between the members. The design–build method allows the project to be split up into packages, where individual components are designed and built as needed to achieve the final completion date. Upon completion of construction the owner takes over the infrastructure.

Construction Management

The owner uses quality, track record, project approach, and cost or schedule adherence criteria to select a “Construction Manager” (CM) who is responsible for building the project. The design work and construction work are contracted separately. Note that the CM can “self-perform” some construction work if they meet transparency criteria. The CM works directly with the owner and designer to provide input as the project moves through design into construction. This input can include construction cost estimating, schedule advice, constructability, and review of design drawings. Construction pricing is refined as the design progresses with a final guaranteed maximum price (GMP) provided to the owner prior at the start of construction. Upon completion of construction the owner takes over the infrastructure.

Public Private Partnership (PPP of P3)

Public-Private-Partnership (also known as P3 or PPP) delivery model involves a contract established between a government entity and a private corporation (Joint Venture or Special Project Vehicle - SPV) to Design, Build, Finance, and optionally Operate and Maintain public infrastructure (sometimes referred to DBFOM). In return, the private entity will receive income that is generated from the project to pay back, and eventually profit from, the investment. At the end of the contract period, the public entity will take over operation of the infrastructure or enter another (bid solicited) contract for continued operation. As mentioned elsewhere, the following picture saves a thousand words illustrating the stakeholder and contractual relationships within a P3 project.



Integrated Project Delivery

Within the Integrated Project Delivery (IPD) model the owner first selects the designer and a Construction Manager (CM) prior to the start of design. All three entities collaborate on determining the goals and objectives of the project before executing a multi-party agreement that is based on a shared risk / reward model, guaranteed costs, and waivers of liability between



team members. IPDs encourage collaboration of knowledge and experience from all the participants and integrates technology such as Computer Aided Design (CAD) Building Information Modeling (BIM) as the project moves through design and construction.

IPD is best suited for complex private sector projects, without a clear scope, and under a tight schedule. Public entities normally cannot use IPD as a delivery method due to the lack of a bidding component and the risk sharing arrangement.

Alliance Model

Unique to Australia and New Zealand the Alliance model is like IPD in that the owner, designer and construction contractor form a multi-party agreement at the start of the project. This agreement is based on shared risk / reward, an open-book approach to contract pricing, and a no blame no disputes philosophy. Alliance models encourage collaboration with decisions made on “best for project” basis. The alliance model is also best suited for complex technical projects, without a clear scope or under a tight schedule.

Downstream Work and Upstream Thinking

This information is sourced (or inspired) from the book “Upstream” by Dan Heath.

One day a group of villagers was working in the fields by a river when one of them sees a baby in the water. Immediately the villager dives in, braving the fierce current, and rescues the infant. During the next several days, more and more babies were found floating downstream, and the villagers rescued them as well. Before long there was a steady stream of babies floating downstream. Soon the whole village was involved in the many tasks of rescue work: pulling these poor children out of the river, ensuring they were properly fed, clothed, and housed, and integrating them into the life of the village. Over time, an entire infrastructure system develops to support their efforts; hospitals, schools, foster carers, social services, trauma and victim support services, life saving trainers, swimming schools etc.

At this point one of the villagers starts walking upstream.

‘Where are you going?’ the others ask, disconcerted, ‘We need you here! Look how busy we are!’

The villager replies: ‘You carry on here ... I’m going upstream to find out why somebody is throwing babies in the river.’

This parable illustrates the concept of downstream work. As people or organizations, we get immersed in an endless cycle of response. We deal with emergencies. We put out fires. We deal with one problem after another, but we never get around to fixing the systems that caused the problems in the first place. We don’t want to abandon downstream work – because we always want somebody to rescue us – but it is desirable to solve the problem before it happens.

There are three forces that push us downstream.

- Problem blindness – When we don’t see a problem, we can’t fix it and we start to believe that negative outcomes are natural or inevitable and out of our control. Our careful attention to one task leads us to miss important information. I’ve got to stay focused on



what I am doing. Lack of peripheral vision, coupled with time pressure, can create passivity even in the face of enormous harm. That is just how it is – so no one questions it. To move upstream we must first overcome problem blindness.

- Lack of ownership - With downstream efforts – the rescues, responses, reactions, emergencies, and fire fighting – the work is demanded of us. Upstream work is chosen, not demanded. Because upstream work is complex and ambiguous, we chose not to go there. That problem is not mine to fix. Unless somebody leads, nobody will.
- Tunneling - When people are juggling a lot of problems, they give up on trying to solve them all. They adopt tunnel vision. We favour reaction, it is easier to see and measure. We are confined to short term reactive thinking, there's only forward. I can't deal with that right now. There's no long-term planning; there's no strategic prioritization of issues. The harm is not that the big problems crowd out the little one – it's the other way around – the little problems crowd out the big ones. People who are tunneling, can't engage in systems thinking. They can't prevent problems; they just react. Tunneling leads you to put off important but not urgent things, but of course you never run out of urgent things to do.

All three barriers work together - we can't fix what we can't see – its not my problem – we have more urgent things to do. It's much easier – and more natural - to stay focused on the immediate and urgent as the default feature of our thinking. We get trapped in an endless cycle of downstream work.

Like the parable – we need to go upstream to find the source of the problem. To break the cycle, we need to use Upstream Thinking – a new evolutionary feature of the human brain. A telltale sign of upstream thinking is that it involves the large-scale systems viewpoint. We need to understand how everything works from a systems perspective to determine the source of the problem. Every system is perfectly designed to get the results it gets. If we reverse engineer the results, that gives us the first clue to the source of the problem. Having taken ownership, our fortitude, intellect, teamwork, and curiosity will break through the barriers of problem blindness and tunneling to guide us to opportunities and then solutions. Going upstream leads to solutions that accomplish massive and long lasting good. When they work – they really work. A journey of a thousand miles begins with a single step. If the first step is upstream – we are going in the right direction.

Development of EPC Contract Document

The starting point for an Engineering Procurement Construction (EPC) contract is typically a template from the archives of the managing consultant, source agency, general contractor, or construction association. Without malice, the originator sets the agenda for the contract, establishing an inherent bias towards the initiator's requirements or constraints.

If needed, modifications to the contract can be completed with professional assistance from engineers, lawyers, architects, accountants, specialty consultants, and in-house resources. Each professional group represents a specific focus, for example, the engineers and architects provide the technical perspective, the lawyers the legal perspective, the in-house resources will represent the procuring agency, and there may be specialty consultants who represent safety, the procurement process, or other special technical issues. Regardless of the initial source the



contract refinement steps are similar. Bring together a team of professionals, compile their contributions - then circulate and revise based on comments. Best practice suggests that each professional group will interface with other professional groups, however, time restrictions and internal focus are factors. Individual roles or functional responsibilities are typically well defined, however the interfaces between stakeholders can be overlooked. The outcome is a contract that diverges into the sum of the parts without a view of the big picture. Nobody looks at how it all fits together.

Noticeably absent from contract development is representation from the construction stakeholder as this would imply a negotiating process before formal procurement. To close this gap – the market sounding process is used, however there are commercial barriers for construction contractors to disclosure information at market sounding. To ensure fairness contracts must be in place – and usually disclosed – during procurement process, making the process inherently reactive. The procuring agency comes to the table with a fixed non-negotiable contract that often lacks market input. As a result, there is an inherent disconnect between contract developers and implementers.

As refining a contract is demanding work, a procuring agency does this for initial projects and then applies the contract to all their projects for a particular methodology. If the contract document works (or is perceived to work), procuring agencies share contracts within a particular methodology. As a result, there are relatively few contract documents (at the local, regional, and national level) used for each project methodology. This scenario is most prevalent in the more complex methodologies on the spectrum. For each project delivery methodology, the status quo has evolved into each project purchasing a garment “off the rack” – one size fits all. However, projects come in different sizes, with different scopes, deliverables, durations, costs, and quality requirements. Each procuring agency has different aptitudes, competencies, expertise, and background. The marketplace has different experience, skills, talents, and abilities. Complex methodologies now involve partnerships, joint ventures, financiers, and lenders. P3 projects can include finance and extend the project life cycle into operations and maintenance. Stakeholders and the roles – relationships them come in many different shapes, sizes, and forms. The contract document pulls it all together. Is there a better way? Is this working from a system perspective? Should we be using upstream thinking? Could the contract development system move upstream towards bespoke / couture as opposed to the status quo – one size fits all?

Delivery of an EPC Project

With the one size fits all contract in place we move forward – focusing on the task at hand – completing the project. This leads us downstream into the self-propagating cycle of response. We deal with emergencies. We put out fires. We favour reaction as it is more tangible and easier to measure. We are pushed downstream by the three barriers; problem blindness - we can't fix what we can't see; lack of ownership - its not my problem to fix; and tunnelling - we have more urgent things to do. We deal with one problem after another, but we never get around to fixing the systems that caused the problems in the first place.

The EPC contract development – delivery system is perfectly designed for the results it gets.



This sets the stage for upstream thinking by applying TOMD – ASP™ discussed in the main body of the white paper.

Problem Summary

The starting point for the delivery of an EPC project is the same, large contract documents with many thousand of words, oversight of the big picture, inherent disconnect between contract developers and implementers, and a focus on downstream work that will manifest in unforeseen problems during the delivery of the project.

APPENDIX B: Problem – Opportunity Pairs for Example 1

Problem A – Evident from the TOMD – ASP™ is the **large volume of support information** combined with the **insufficient time** (less than 10 days) **to make the two critical decisions** towards the end of the process. The two critical decisions are represented by the diamond shaped decisions boxes in the upper right portion of the TOMD – ASP™ (labeled GG and LL in stakeholder #2's swim lane). Upstream of these decisions (and in stakeholder #1's swim lane) are three boxes called "Deliverables" (labeled W with 4 bullets - see problem E), "Submittals" (labeled X with 8 bullets – see problem B) and "Things that need to get done" (labelled Y with 13 bullets – see problem C). Each of the $4 + 8 + 13 = 25$ bullets represent voluminous compilation of archives reports – records – certificates, etc. that are reviewed – approved – rejected within a 10-day timeframe to determine to success of the overall project. $8 + 13 = 21$ of the bullets are not visible to stakeholder #2 before the start of the 10-day decision period. The recommended **opportunity** is for the stakeholder #1 is to **provide decision making information in advance**, however, there is no requirement to do this in the contract. The opportunity is rated as 3 / 10 or **easy to implement** as the information is required to manage the project, just a matter of disclosing it to stakeholder #2. The existing contract enables procrastination and encourages non-disclose of information with hidden mistakes (that will surface eventually). Rated as 9/10 or **essential to project success** in terms of ability of make key decisions with relevant information. Without required supporting information, the key decision will be a "no" or delay the project until the supporting information is available. Estimated cost to disclose problem – opportunity A is 16 hours consulting time while the benefit to these changes is over \$30 million.

Opportunity B – The 4 off-page connectors (labeled A, B, C, and D shaped like a home plate in the stakeholder #2's swim lane) show an **opportunity** to provide **advance insight of the decision-making information** to stakeholder #2. If the contract had used this approach for other "submittals" and "things that need to get done" it would eliminate most of problem A. Rated as 4 / 10 or **straight forward to implement** with a **consequence** rating of 7 / 10 or **necessary**. Given that the contract required advance insight for 4 of the 25 requirements there is no reason that this process could not be applied to the other 21 requirements (note that some requirements may be eliminated with the next POP - C). Recommend stakeholder workshop towards consensus supported by written confirmation and contract amendment. Estimated cost to uncover problem - opportunity B is 14 hours consulting time while the benefit to these changes is over \$20 million.



Problem C – The redacted box called “Submittals” (labeled X - with 8 bullets) has **duplications** and **overlaps**. Compounding the problem, the responsibility for delivery of each submittals is **unclear** because the **sign off process** does not align with functional responsibilities of the signatories. The **opportunities** were to **remove duplications** and reduce overlap by **clarifying roles & responsibilities for deliverables**. Rated as 5 / 10 or **challenging to implement** and as 7 / 10 or **significant** for project success. Duplications can be eliminated; however, revision of roles / responsibilities will require contentious trade-offs between stakeholders. Recommend workshop towards consensus supported by written confirmation and contract amendment. If not completed the status quo creates animosity between stakeholders with omissions of deliverables. Estimated cost to disclose problem – opportunity C is 20 hours consulting time while the benefit to these changes is over \$12 million.

Problem D – The redacted box called “Things that need to get done” (labeled Y with 13 bullets) has many **ambiguities**. Some of the problems include one requirement that can not be physically complete at this time, a second requirement that depend on infrastructure not in service, and a third requirement that needs data from a future deliverable. Recommended opportunities included **eliminating specific requirements** (that are not feasible) and **changing requirements to appropriate timeframe**. Rated as 3 / 10 or **easy to implement** and 7 / 10 as **significant for project success**. The question is not if the requirements are necessary – they are. The question is when can they be completed? The opportunity positions the requirements at the appropriate timeframe and closes a loophole in the contract that will increase animosity, delay, and escalate project costs. Estimated cost to disclose problem – opportunity D is 20 hours consulting time while the benefit to these changes is over \$20 million.

Summarizing problems, A, C, and D along with opportunity B – it appears that the contract authors independently developed a list of “submittals”, “deliverables”, and “things that need to get done” then arbitrarily included them in the contract without considering the sequence, dependency, and responsibility for these items. TOMD – ASP™ shows their flaws in their logic and lack of foresight. Rectifying these problems will be challenging as it requires altering stakeholder responsibility / behavior / expectations and amending the contract document. However, the overall benefit to the project (\$82 million) in terms of teamwork, time and cost savings are well worth the effort.

Problem E – As the TOMD – ASP™ moves through the project life cycle it tracks key approval certificates. The intent was to advise stakeholders of the approval step, but this was done by having **non responsible parties execute approval documents**. This enabled the non-approval stakeholders to disrupt the process flow by withholding signatures. Note that this problem originates in the preceding TOMD – ASP™ not illustrated in Example 1. The suggested **opportunity** is to **align the signatures on approval certificates with responsible parties and distribute the documents to others FYI**. Rated as 4 / 10 or straight forward to implement and 6 / 10 or important for project success. To implement requires dialogue and workshops to align stakeholder expectations with the functional responsibility and amendment to the contract. It should become apparent that over-extending approval by a non-responsible party is unlikely to benefit any stakeholder. Also, pragmatic stakeholders are unlikely to sign off on certificates they are not responsible for. Implementing this opportunity closes a loophole the



prevents a project interruption scenario for conflicting stakeholders. Cost to disclose problem N was 15 hours consulting time while the benefit to the solution was over \$10 million.

Problem F – Stakeholder #3 (in the top swim lane) has only three touch points to the overall process. The first touch point (task J) provides advisory notice to the stakeholder and does not connected to any downstream activities. The large information gap before the next two touch points (tasks BB and FF) - to provide input to the final two key decisions – means the **stakeholder lacks valuable information to provide direction for key decisions**. Caveat – other upstream processes may provide stakeholder #2 information, but they are not well defined in the contract (note they are not on this portion of this TOMD – ASP™). **Opportunities** suggested better **definition of information workflow to specific stakeholders**. Rated as 8 / 10 or **demanding to implement** and 9 / 10 as **essential for project success**. Considered a “necessary evil” for project success. The opportunity requires a delicate balance between information disclosure and maintaining the integrity of P3 project delivery methodology. Also compounded by relationships to other opportunities not disclosed. Recommend resolute workshop(s) towards consensus supported by written confirmation and contract amendment. Estimated cost to disclose problem – opportunity E is 20 hours consulting time while the benefit to these changes is over \$12 million.

Problem(s) G – For context, a cursory contract review was prepared for the design – construction phases of the project life cycle before completing the TOMD – ASP™ for the end of the construction phase. Therefore, the TOMD – ASP™ did not consider project communication, schedule, budget, project monitoring – controls, progress payments, design, construction, installation, work packages, and submittal processes. Had the TOMD – ASP considered the entire project life cycle it would have uncovered many other problem – opportunity pairs. Estimated cost to disclose these problem – opportunity pairs was 60 hours consulting time while the benefit of the solutions was over \$100 million.

APPENDIX C: Problem – Opportunity Pairs for Example 2

Problem H – Evident from the TOMD – ASP™ is the abundance of stakeholders involved in the process, the significant distance between tasks (that skip over adjacent stakeholders) and the lack of activity for some of the stakeholders. In summary, there are many **stakeholders that do not contribute significantly to the process**. In fairness to the agency, this TOMD – ASP™ is all-inclusive with one stakeholder subdivided into three positions and three other stakeholders equivalent academic institutions (with similar requirements). The recommended **opportunity** was to **reduce the number of roles** (but **add resources** for similar roles) for the agency and **consolidate document and approval processes** between the three equivalent stakeholders. Rated as 3 / 10 or **easy to implement** and 6 / 10 or **important for process improvement**. Given the small size of the agency it was intuitive to combine the work under one role and add resources as demand increased. Combining the 3 academic institutions into one approval form / process was self evident. Consolidating the work and merging similar processes gained efficiencies that made the process more effective. Estimated cost to disclose problem G was 12 hours consulting time while the benefit to the solution was \$100 thousand.



Problem I – The approval signature matrix for all stakeholders is illustrated in the bottom three swim lanes. Review of the signature process indicated **too many stakeholder approvals** at many intermediate steps when the final approval was paramount. This induced many **unnecessary steps** that were time consuming, confusing to applicants and slowed the process down. Compounding the problem, the **reviewing stakeholder was not a signatory** on the approved contract leading to an **accountability gap**. In addition, the **industry support** was not required until after approval **eroding transparency and trust** with industry partners. Many **opportunities** were suggested to **focus on final approval, include the reviewing stakeholder** and **engage industry earlier** in the process. Rated as 7 / 10 or problematic to implement and 5 / 10 or marginal for consequence of process success. Adding a key signature on the approval form conflicted with removal of many others in a highly political process. Early outreach to industry champions was viewed as loss of control from the academic community. Given that the opportunity was largely administrative it had limited consequence on the overall process. Cost to disclose problem H was 15 hours consulting time while the benefit to the solution was \$100 thousand plus additional time – cost savings by streamlining the process.

Problem J – The responsible stakeholder did not have a **mechanism to manage the interval between the procurement – application cycles**. This led two scenarios; cycles with excessive applicants, insufficient evaluation resources, and insufficient available funding; or cycles with too few applicants, surplus evaluation resources and unallocated funding. Compounding the problem was the **poor-quality applications** requiring additional support from the approving stakeholder. **Opportunities** included **simplifying – automating the application process, instructional seminars** with applicants and pseudo **market sounding events** to assess demand. Rated as 5 / 10 or challenging to implement and 8 / 10 or essential for process success. This opportunity required workflow refinement, development time & costs for software and webpage tools, additional time with applicants, and time commitments within the marketplace. The improvements to tools and workflow made a significant impact on the overall process. Additional proximity to both applicants and industry provided valuable insight to manage the interval between cycles. Cost to disclose problem I was 20 hours consulting time while the benefit to the solution was \$100 thousand.

Problem K – The TOMD – ASP™ was extended past the procurement process to the project work, deliverable, invoice, payment, account reconciliation, and evaluation processes. **Insufficient resources** were allocated to **project controls and monitoring**. **Opportunities** suggested **implementing a robust deliverable monitoring and invoice support system**. Rated as 4 / 10 or straight forward for implementation and 3 / 10 or slight process improvement consequence (for the procurement process). This opportunity required better oversight and implementing better financial control. Although these enhancements improved visibility and control, they had less impact on the procurement effectiveness of each project. Estimated cost to disclose problem J was 15 hours consulting time while the benefit to the solution was over \$50 thousand.

Problem(s) L – The TOMD – ASP™ identified **other opportunities** not disclosed (in this white paper). Estimated cost to disclose these problems was 30 hours consulting time while the benefit of the solutions was over \$100 thousand.



APPENDIX D: Problem – Opportunity Pairs for Example 3

Problem M – During the process of developing the TOMD – ASP™ key word searches are used find out where a function or component of the project life cycle appears in the contract document. Examples of key word searches could include “testing”, “commissioning”, “service commencement”, “safety”, “operations”, “certification”, “submittal”, and “approval”. Analyzing the contract wording adjacent to a specific keyword often uncovers inconsistent usage of the term (or related terms). Further research into the definitions section of the contract revealed that many of the terms are **not defined, used inconsistently, and do not align with standard industry practice**. This leads to misinterpretation that is the catalyst for conflict, disputes, and claims. The recommended **opportunity** is to **define all terms, use them consistently, and align terminology with industry practice**. Rated as 2 / 10 or simple to implement and 9 / 10 or essential for project success. This opportunity is a quick win. The opportunity requires two steps; first facilitating stakeholder consensus on key definitions; and second, word processing the contract using the “find” and “replace” functions. Cost to disclose problem M was 10 hours consulting time while the benefit to the solution was over \$30 million.

Problem N – Further to problem M, the TOMD – ASP™ indicated that **three interrelated procedures are not well defined**, leading to a misunderstanding in how to implement these procedures. This resulted in a dispute between key stakeholders that required resolution by a third party. The recommended **opportunity** is to **align procedural terms within the contract document(s)**. Rated as 3 / 10 or easy to implement and 8 / 10 or necessary for project success. This is another example of a quick win. Undefined procedures are directly related but independent of undefined terms and requires a facilitated consensus on key terms followed by administrative edits to the contract document. Undefined procedures are more complex to align because a procedure requires defining multiple steps in comparison to a single term. Estimated cost to disclose problem N was 14 hours consulting time while the benefit to the solution was over \$20 million.

Summarizing problems M and N – it appears that the contract authors erroneously assumed there was a common understanding of key terms - procedures and failed to check for consistent application of the terms - procedures in the contract document. Unfortunately, definition of some key terms were omitted. Also, there is evidence that narrow understanding of key terms was extrapolated to a broader application in the contract document that did not fit intent – furthering the confusion. Application of the TOMD – ASP™ combined with technical expertise and business acumen quickly uncovers terminology – procedural inconsistencies that even the best proof-reader would have missed.

Problem O – The TOMD – ASP™ uncovered a **gap in governance** (see “Committee across multiple stakeholders” B, J, and AB). Governance issues are escalated to two steering committees with membership from the key stakeholders. The mandate of these committees (as defined in the project agreement) does not provide governance as the project moves through phases of the project life cycle. Recommended **opportunities** included **re-aligning the steering committee mandates** (within the project agreement), **enable the establishment of sub-committees** or **enabling steering committees to set their terms of reference** (outside



of the project agreement). Rated as 7 / 10 or problematic to implement and 5 / 10 or marginal for project success. Implementation requires clarification of roles / responsibilities within the steering committee and entrenched in the project agreement. A pragmatic viewpoint would suggest the steering committees would cover this gap voluntarily, however, animosity between stakeholders during a troublesome project typically reverts to the contract where this governance gap exists. Implementing this opportunity closes a loophole that could save significant project distress. Cost to disclose problem J was 6 hours consulting time while the benefit to the solution was over \$4 million.

Problem P – In comparison to similar projects, the TOMD – ASP™ uncovered a possible **gap in governance scope** (see “Committee across multiple stakeholders” B, J, and AB) that is different than problem O. The recommended **opportunity** is to **discuss governance scope with the stakeholders** to determine if the omission was intentional with this scope is covered by others outside of the project. Rated as 7 / 10 or problematic to implement and 3 / 10 or slight consequence on project success. Implementing this opportunity may require changing terms entrenched in the project agreement. Like the opportunity O, this opportunity could save the project between zero (covered by others) and \$5.0 million (scope change to steering committee). Cost to disclose problem P was 4 hours consulting time while the benefit to the solution is TBD.

Summarizing problems O and P – it appears that the contract authors only considered a portion of the project life cycle (or scope) and functional responsibility of the stakeholders when establishing the mandate of the project steering committee(s). This problem could have been rectified by a comprehensive scope definition or allowing the committee(s) to extend their scope by special decree. Although the steering committee may still voluntarily close this gap, this loophole could create significant project distress if there is animosity between stakeholders. Application of the TOMD – ASP™ combined with process expertise and business acumen uncovered this discrepancy.

Problem Q – The TOMD – ASP™ indicates that a key mid-project planning document needs to be submitted by one stakeholder and approved by another. The **timeframe** for submission and approval of this document is **not defined** creating potential project delays. Compounding the problem, **deliverables** within the planning document are **inappropriately sequenced** and can **not be completed** when the document is submitted. Recommended **opportunity** is to **define a deadline** for document submission – approval relative to project milestones and to **re-allocate the deliverables** from the planning document. Rated as 8 / 10 or demanding to implement and 8 / 10 or essential for project success. The opportunity requires structural changes to mid-project deliverables - approval cycles through facilitated stakeholder workshops (or if necessary, further upstream with value engineering). Regardless of the difficulty, this opportunity must be done as the stakeholder communication issues are causing significant project delays. This is a necessary evil. Cost to disclose problem Q was 10 hours consulting time while the benefit to the solution was \$12 million.

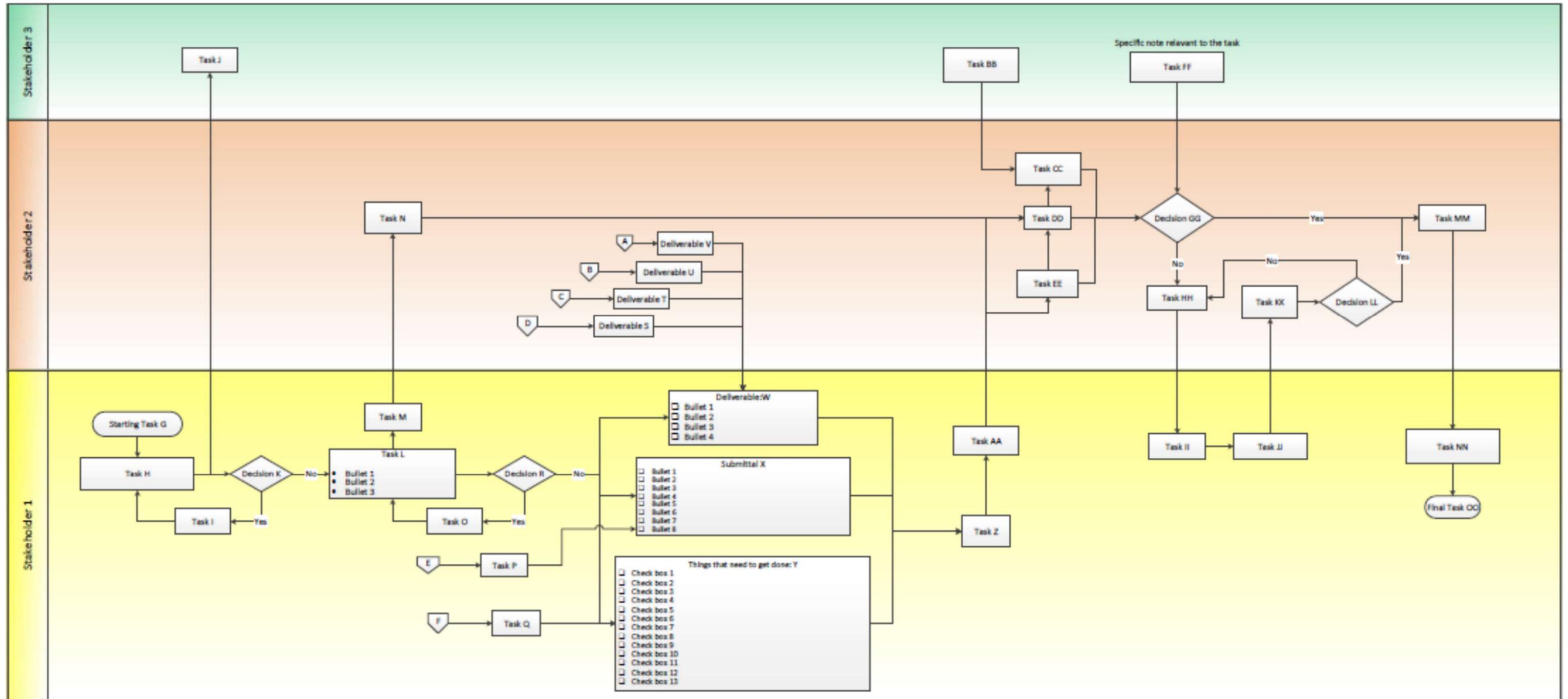
Problem R – The TOMD – ASP™ indicates an omission in the requirement for a database of key project documents. The recommended **opportunity** is to **include the database requirement in the contract document**. Rated as 2 / 10 or simple to implement and 8 / 10 or



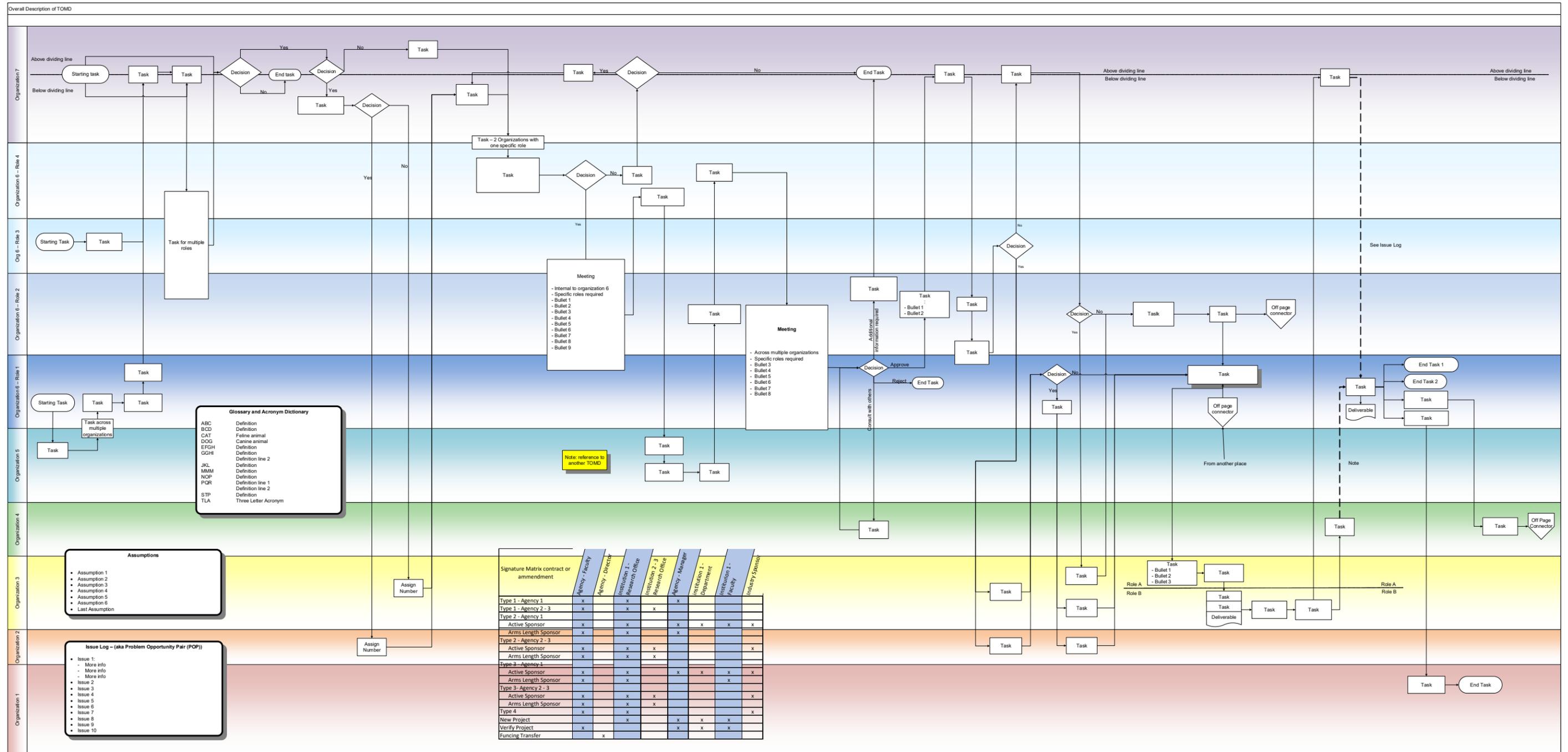
necessary for project success. Quick win through edits to the contract document. A pragmatic viewpoint suggest that the stakeholders would agree to this database requirement as a key communication tool, however, animosity between stakeholders during a project typically reverts to the contract where this database gap exists. In this project, the stakeholders took the pragmatic approach and used a database for communications, however, the requirement was never formalized. Implementing this opportunity closes a loophole that would have saved the project \$5.0 million if the rational approach were not applied. Cost to disclose problem R was 6 hours consulting time while the benefit to the solution was over \$5 million.

Problem(s) S – For context, a limited contract review was prepared for the design – construction phases of the project life cycle before completing the TOMD – ASP™ for the end of the construction phase. Therefore, the TOMD – ASP™ did not consider project communication, schedule, budget, project monitoring – controls, progress payments, design, construction, installation, work packages, and submittal processes. Had the TOMD – ASP™ considered the entire project life cycle it would have uncovered many other problem – opportunity pairs. Estimated cost to disclose these problem – opportunity pairs was 60 hours consulting time while the benefit of the solutions was over \$100 million.

Appendix B: TOMD – ASP™ Example 1



Appendix C: TOMD – ASP™ Example 2



Appendix D: TOMD – ASP™ Example 3

