TWO HARBORS INVESTMENT CORP. Form 424B3 June 25, 2018

Use these links to rapidly review the document TABLE OF CONTENTS

Table of Contents

Filed Pursuant to Rule 424(b)(3) Registration Statement No. 333-225242

JOINT PROXY STATEMENT/PROSPECTUS

MERGER PROPOSED YOUR VOTE IS VERY IMPORTANT

June 25, 2018

To the Stockholders of Two Harbors Investment Corp. and the Stockholders of CYS Investments, Inc.:

The board of directors (the "Two Harbors Board") of Two Harbors Investment Corp. ("Two Harbors") and the board of directors (the "CYS Board") of CYS Investments, Inc. ("CYS"), each a Maryland corporation, each have approved an Agreement and Plan of Merger, dated as of April 25, 2018 (the "Merger Agreement"), by and among Two Harbors, Eiger Merger Subsidiary LLC ("Merger Sub") and CYS, pursuant to which Merger Sub will merge with and into CYS, with CYS continuing as the surviving corporation (the "Merger"). As a result of the Merger, the surviving corporation will become an indirect, wholly owned subsidiary of Two Harbors. The closing of the Merger will occur as promptly as practicable following satisfaction of all closing conditions set forth in the Merger Agreement, and either Two Harbors or CYS may terminate the Merger Agreement if closing has not occurred by October 31, 2018. After the Merger, the combined company of Two Harbors and CYS will retain the name "Two Harbors Investment Corp." and its shares will continue to trade on the New York Stock Exchange under the symbol "TWO".

Pursuant to the terms and subject to the conditions set forth in the Merger Agreement, at the effective time of the Merger, each outstanding share of common stock, par value \$0.01 per share, of CYS ("CYS Common Stock") will be converted into the right to receive from Two Harbors (a) a number of shares of common stock, par value \$0.01 per share, of Two Harbors ("Two Harbors Common Stock") determined (to the nearest one-ten-thousandth) by dividing (i) CYS's adjusted book value per share, multiplied by 96.75%, by (ii) Two Harbors' adjusted book value per share, multiplied by 94.20%, each as calculated at a time and pursuant to certain calculation principles set forth in the Merger Agreement, and (b) \$15,000,000 divided by the sum of the number of shares of CYS Common Stock issued and outstanding immediately prior to the effective time of the Merger (excluding any cancelled shares), including outstanding CYS restricted stock that will vest upon completion of the Merger pursuant to the Merger Agreement (less any shares surrendered for income tax purposes).

Based on the number of shares of CYS Common Stock outstanding on June 22, 2018, the record date for the Two Harbors special meeting, and an assumed exchange ratio of 0.4872 based on the adjusted book value per share of Two Harbors Common Stock and CYS Common Stock as of March 31, 2018, calculated in accordance with the Merger Agreement, we expect approximately 75.7 million shares of Two Harbors Common Stock will be issued in connection with the Merger. The actual Exchange Ratio will be publicly announced at least five business days before each of the special meetings of stockholders described below.

In addition, each share of 7.75% Series A Cumulative Redeemable Preferred Stock, par value \$0.01 per share, of CYS (the "CYS Series A Preferred Stock") will be converted into the right to receive one share of newly classified 7.75% Series D Cumulative Redeemable Preferred Stock, par value \$0.01 per share, of Two Harbors (the "Two Harbors Series D Preferred Stock"), and each share of 7.50% Series B Cumulative Redeemable Preferred Stock, par value \$0.01 per share, of CYS (the "CYS Series B Preferred Stock") will be converted into the right to receive one share of newly classified 7.50% Series E Cumulative Redeemable Preferred Stock, par value \$0.01 per share, of Two Harbors (the "Two Harbors Series E Preferred Stock").

In connection with the Merger, PRCM Advisers LLC ("PRCM Advisers"), Two Harbors' external manager and a subsidiary of Pine River Capital Management L.P., has agreed to reduce the base management fee it charges Two Harbors with respect to the additional equity under management resulting from the Merger from 1.5% of stockholders' equity on an annualized basis to 0.75% through the first anniversary of Closing. PRCM Advisers will also make a one-time downward adjustment of \$15,000,000 to the management fees payable by Two Harbors for the quarter in which the Merger closes as well as a downward adjustment to the management fees payable by Two Harbors of up to an additional \$3.3 million to reimburse Two Harbors for certain transaction-related expenses.

Two Harbors and CYS will each hold a special meeting of their respective common stockholders. Two Harbors' special meeting will be held at 601 Carlson Parkway, 2nd Floor, Minnetonka, Minnesota 55305 on July 27, 2018, at 9:00 a.m., Central Time. CYS's special meeting will be held at 50 Rowes Wharf, Boston, Massachusetts 02110 on July 27, 2018, at 9:00 a.m., Eastern Time. The preferred stockholders of each of CYS and Two Harbors are not entitled to vote on any of the matters to be considered and voted upon at the CYS special meeting or the Two Harbors special meeting, as applicable.

At the Two Harbors special meeting, the Two Harbors common stockholders will be asked to (i) consider and vote on a proposal to approve the issuance of shares of Two Harbors Common Stock in the Merger and upon any conversion (upon certain future changes of control of Two Harbors, if any) of the Two Harbors Series D Preferred Stock and Two Harbors Series E Preferred Stock to be issued in the Merger (the "Two Harbors Common Stock Issuance Proposal") and (ii) approve the adjournment of the Two Harbors special meeting, if necessary or appropriate, for the purpose of soliciting additional votes for the approval of the Two Harbors Common Stock Issuance Proposal (the "Two Harbors Adjournment Proposal"). The Two Harbors Board has unanimously (i) determined that the Merger Agreement and the other transactions contemplated therein, including the Merger and the issuance of shares of Two Harbors Common Stock (the "Two Harbors Common Stock Issuance"), are in the best interests of Two Harbors and its stockholders, (ii) approved the Merger Agreement and the other transactions contemplated therein, including the Merger and the Two Harbors Common Stock Issuance Proposal be submitted to the holders of Two Harbors Common Stock for consideration at the Two Harbors special meeting and (iv) recommended that the holders of Two

Harbors Common Stock approve the Two Harbors Common Stock Issuance Proposal. The Two Harbors Board unanimously recommends that the Two Harbors common stockholders vote "FOR" the Two Harbors Common Stock Issuance Proposal and "FOR" the Two Harbors Adjournment Proposal. Only those matters included in the Two Harbors Notice of Meeting may be considered and voted upon at the Two Harbors special meeting.

At the CYS special meeting, the CYS common stockholders will be asked to (i) consider and vote on a proposal to approve the Merger (the "Merger Proposal"), (ii) consider and vote on a non-binding advisory proposal to approve the compensation that may be paid or become payable to CYS's named executive officers that is based on or otherwise relates to the Merger (the "CYS Non-Binding Compensation Advisory Proposal"), and (iii) approve the adjournment of the CYS special meeting, if necessary or appropriate, for the purpose of soliciting additional votes for the approval of the Merger Proposal (the "CYS Adjournment Proposal"). The CYS Board, acting upon the unanimous recommendation of a special committee of independent directors of CYS formed for the purpose of, among other things, evaluating and making a recommendation to the CYS Board with respect to the Merger Agreement and the other transactions contemplated therein, has unanimously (i) determined that the Merger Agreement and the other transactions contemplated therein, including the merger of Merger Sub with and into CYS, are in the best interests of CYS and its stockholders, (ii) approved the Merger Agreement and declared that the transactions contemplated therein, including the Merger, are advisable, (iii) directed that the Merger and the other transactions contemplated by the Merger Agreement be submitted to the holders of CYS Common Stock for consideration at the CYS special meeting and (iv) recommended that the CYS common stockholders approve the Merger and the other transactions contemplated by the Merger Agreement.

The CYS Board unanimously recommends that the CYS common stockholders vote "FOR" the Merger Proposal, "FOR" the CYS Non-Binding Compensation Advisory Proposal and "FOR" the CYS Adjournment Proposal. Only those matters included in the CYS Notice of Meeting may be considered and voted upon at the CYS special meeting.

This joint proxy statement/prospectus provides detailed information about the special meetings of Two Harbors and CYS, the Merger Agreement, the Merger and other related matters. A copy of the Merger Agreement is included as Annex A to this joint proxy statement/prospectus. We encourage you to read this joint proxy statement/prospectus, the Merger Agreement and the other annexes to this joint proxy statement/prospectus carefully and in their entirety. In particular, you should carefully consider the discussion in the section of this joint proxy statement/prospectus entitled "Risk Factors" beginning on page 43. You may also obtain more information about each company from the documents they file with the Securities and Exchange Commission (the "SEC").

Whether or not you plan to attend the Two Harbors special meeting or the CYS special meeting, as applicable, please complete, date, sign and return, as promptly as possible, the enclosed proxy card in the accompanying reply envelope or authorize a proxy to vote your shares through the Internet or by telephone. You may also authorize a proxy to vote your shares over the Internet using the Internet address on the enclosed proxy card or by telephone using the toll-free number on the enclosed proxy card. If you authorize a proxy to vote your shares through the Internet or by telephone, you will be asked to provide the company number and control number from the enclosed proxy card. If you attend a special meeting and vote in person, your vote by ballot will revoke any proxy previously submitted.

Your vote is very important, regardless of the number of shares of stock you own. Whether or not you plan to attend the Two Harbors special meeting or the CYS special meeting, as applicable, please authorize a proxy to vote your shares of stock as promptly as possible to make sure that your shares of stock are represented at the applicable special meeting. Please note that the failure to vote, or authorize a proxy to vote, your shares of stock of CYS is the equivalent of a vote against the Merger Proposal.

Thank you in advance for your continued support.

Sincerely,

Thomas E. Siering Chief Executive Officer, President and Director

Two Harbors Investment Corp.

Kevin E. Grant Chief Executive Officer, Chairman, President, Chief Investment Officer and Founder

CYS Investments. Inc.

Neither the SEC nor any state securities regulatory agency has approved or disapproved of the securities to be issued in connection with the Merger or passed upon the adequacy or accuracy of this joint proxy statement/prospectus. Any representation to the contrary is a criminal offense.

This joint proxy statement/prospectus is dated June 25, 2018, and is first being mailed to the stockholders of Two Harbors and the stockholders of CYS on or about June 27, 2018.

Table of Contents

575 Lexington Avenue Suite 2930 New York, New York 10022

NOTICE OF SPECIAL MEETING OF TWO HARBORS COMMON STOCKHOLDERS TO BE HELD ON JULY 27, 2018

NOTICE IS HEREBY GIVEN that a special meeting of stockholders of Two Harbors Investment Corp., a Maryland corporation ("Two Harbors"), will be held at 601 Carlson Parkway, 2nd Floor, Minnetonka, Minnesota 55305 on July 27, 2018 at 9:00 a.m., Central Time, for the following purposes:

- to consider and vote on a proposal to approve the issuance of shares of common stock, par value \$0.01 per share, of Two Harbors ("Two Harbors Common Stock") pursuant to the Agreement and Plan of Merger (the "Merger Agreement"), dated as of April 25, 2018, by and among Two Harbors, Eiger Merger Subsidiary LLC, a Maryland limited liability company, and CYS Investments, Inc., a Maryland corporation, as it may be amended from time to time, a copy of which is attached as Annex A to the joint proxy statement/prospectus accompanying this notice (the "Two Harbors Common Stock Issuance Proposal"); and
- 2. to consider and vote on a proposal to adjourn the special meeting, if necessary or appropriate, including to solicit additional proxies if there are not sufficient votes to approve the Two Harbors Common Stock Issuance Proposal (the "Two Harbors Adjournment Proposal").

Two Harbors will transact no other business at the Two Harbors special meeting or any adjournment or postponement thereof. Please refer to the attached joint proxy statement/prospectus for further information with respect to the business to be transacted at the Two Harbors special meeting. The board of directors of Two Harbors (the "Two Harbors Board") has fixed the close of business on June 22, 2018 as the record date for the determination of Two Harbors stockholders entitled to notice of, and to vote at, the Two Harbors special meeting or any adjournments or postponements thereof. Accordingly, only common stockholders at the close of business on that date are entitled to notice of, and to vote at, the Two Harbors special meeting and any adjournments or postponements thereof.

The Two Harbors Board has unanimously (i) determined that the Merger Agreement and the other transactions contemplated therein, including the Merger and the issuance of shares of Two Harbors Common Stock (the "Two Harbors Common Stock Issuance"), are in the best interests of Two Harbors and its stockholders, (ii) approved the Merger Agreement and the other transactions contemplated therein, including the Merger and the Two Harbors Common Stock Issuance, (iii) directed that the Two Harbors Common Stock Issuance Proposal be submitted to the holders of Two Harbors Common Stock for consideration at the Two Harbors special meeting and (iv) recommended that the holders of Two Harbors Common Stock approve the Two Harbors Common Stock Issuance Proposal. The Two Harbors Board unanimously recommends that the Two Harbors common stockholders vote "FOR" the Two Harbors Common Stock Issuance Proposal and "FOR" the Two Harbors Adjournment Proposal.

Your vote is very important, regardless of the number of shares of Two Harbors Common Stock you own. Whether or not you plan to attend the Two Harbors special meeting, please authorize a proxy to vote your shares as promptly as possible to make sure that your shares are represented at the Two Harbors special meeting. Properly executed proxy cards with no instructions indicated on the proxy card will be voted "FOR" the Two Harbors Common Stock Issuance Proposal and "FOR" the Two

Table of Contents

Harbors Adjournment Proposal. Even if you plan to attend the Two Harbors special meeting in person, we urge you to authorize a proxy as promptly as possible by (1) accessing the Internet website specified on your proxy card, (2) calling the toll-free number specified on your proxy card or (3) completing, signing, dating and returning the enclosed proxy card in the accompanying postage-paid envelope prior to the Two Harbors special meeting to ensure that your shares will be represented and voted at the Two Harbors special meeting. If you hold your shares of Two Harbors Common Stock in "street name," which means through a bank, broker or other nominee, please follow the instructions on the voting instruction card furnished to you by such record holder.

Please note that if you hold shares of stock in different accounts, it is important that you vote or authorize a proxy to vote the shares of stock represented by each account. If you attend the Two Harbors special meeting, you may revoke your proxy and vote in person, even if you have previously returned your proxy card or authorized a proxy to vote your shares through the Internet or by telephone. If your shares of Two Harbors Common Stock are held by a bank, broker or other nominee, and you plan to attend the Two Harbors special meeting in person, please bring to the special meeting your statement evidencing your beneficial ownership of your shares of Two Harbors Common Stock. Please carefully review the instructions in the enclosed joint proxy statement/prospectus and the enclosed proxy card or the information forwarded by your bank, broker or other nominee regarding each of these options.

This notice and the enclosed proxy statement/prospectus are first being mailed to Two Harbors stockholders on or about June 27, 2018.

By Order of the Board of Directors,

Rebecca B. Sandberg

Vice President, General Counsel and Secretary

New York, New York June 25, 2018

Table of Contents

| 500 | Totten | Pond | Road, | 6 th 1 | Floor |
|------------|--------|-------|--------|--------------------------|-------|
| Wa | ltham, | Massa | chuset | tts 0 | 2451 |

NOTICE OF SPECIAL MEETING OF CYS COMMON STOCKHOLDERS TO BE HELD ON JULY 27, 2018

NOTICE IS HEREBY GIVEN that a special meeting of stockholders of CYS Investments, Inc., a Maryland corporation ("CYS") will be held at 50 Rowes Wharf, Boston, Massachusetts 02110 on July 27, 2018 at 9:00 a.m., Eastern Time, for the following purposes:

- 1.

 to consider and vote on a proposal (the "Merger Proposal") to approve the merger transaction in which CYS merges with and into Eiger Merger Subsidiary LLC, a Maryland limited liability company, ("Merger Sub") related to that certain Agreement and Plan of Merger (the "Merger Agreement"), dated as of April 25, 2018, among Two Harbors Investment Corp., a Maryland corporation, Merger Sub and CYS, as it may be amended from time to time, a copy of which is attached as Annex A to the joint proxy statement/prospectus accompanying this notice;
- to consider and vote on a non-binding advisory proposal to approve the compensation that may be paid or become payable to CYS's named executive officers that is based on or otherwise relates to the Merger (the "CYS Non-Binding Compensation Advisory Proposal"); and
- 3. to consider and vote on a proposal to approve the adjournment of the CYS special meeting, if necessary or appropriate, for the purpose of soliciting additional votes for the approval of the Merger Proposal (the "CYS Adjournment Proposal").

CYS will transact no other business at the special meeting or any adjournment or postponement thereof. These items of business are described in the enclosed joint proxy statement/prospectus. The CYS board of directors (the "CYS Board") has designated the close of business on June 22, 2018 as the record date for the purpose of determining the stockholders who are entitled to receive notice of, and to vote at, the CYS special meeting and any adjournments or postponements of the special meeting, unless a new record date is fixed in connection with an adjournment or postponement of the special meeting. Accordingly, only CYS common stockholders at the close of business on the record date are entitled to notice of the CYS special meeting and only CYS common stockholders are entitled to vote at the CYS special meeting and at any adjournment or postponement of the special meeting.

The CYS Board, acting upon the unanimous recommendation of a special committee of independent directors of CYS formed for the purpose of, among other things, evaluating and making a recommendation to the CYS Board with respect to the Merger Agreement and the other transactions contemplated therein, has unanimously (i) determined that the Merger Agreement and the other transactions contemplated therein, including the merger of Merger Sub with and into CYS, are in the best interests of CYS and its stockholders, (ii) approved the Merger Agreement and declared that the transactions contemplated therein, including the Merger, are advisable, (iii) directed that the Merger and the other transactions contemplated by the Merger Agreement be submitted to the holders of CYS Common Stock for consideration at the CYS special meeting and (iv) recommended that the CYS common stockholders approve the Merger and the other transactions contemplated by the Merger Agreement. The CYS Board unanimously recommends that the CYS common stockholders vote "FOR" the Merger Proposal, "FOR" the CYS Non-Binding Compensation Advisory Proposal and "FOR" the CYS Adjournment Proposal.

Table of Contents

Your vote is very important, regardless of the number of shares of CYS you own. Whether or not you plan to attend the CYS special meeting, please authorize a proxy to vote your shares as promptly as possible to make sure that your shares are represented at the special meeting. Properly executed proxy cards with no instructions indicated on the proxy card will be voted "FOR" the Merger Proposal, "FOR" the CYS Non-Binding Compensation Advisory Proposal and "FOR" the CYS Adjournment Proposal. Even if you plan to attend the CYS special meeting in person, we request that you complete, sign, date and return the enclosed proxy card in the accompanying envelope prior to the special meeting to ensure that your shares will be represented and voted at the special meeting if you are unable to attend. If you hold your CYS shares in "street name," which means through a bank, broker or other nominee, you must obtain a legal proxy from this bank, broker or other nominee in order to vote in person at the CYS special meeting.

If you do not vote on the Merger Proposal, this will have the same effect as a vote by you against the approval of the Merger Proposal.

Please note that if you hold shares of stock in different accounts, it is important that you vote or authorize a proxy to vote the shares of stock represented by each account. If you attend the CYS special meeting, you may revoke your proxy and vote in person, even if you have previously returned your proxy card or authorized a proxy to vote your shares through the Internet or by telephone. If your CYS shares are held by a bank, broker or other nominee, and you plan to attend the CYS special meeting in person, please bring to the special meeting your statement evidencing your beneficial ownership of your CYS shares. Please carefully review the instructions in the enclosed joint proxy statement/prospectus and the enclosed proxy card or the information forwarded by your bank, broker or other nominee regarding each of these options.

By Order of the Board of Directors,

Thomas A. Rosenbloom

Executive Vice President of Business Development, General Counsel, and Secretary

Waltham, Massachusetts June 25, 2018

Table of Contents

ADDITIONAL INFORMATION

This joint proxy statement/prospectus incorporates important business and financial information about Two Harbors and CYS from other documents that are not included in or delivered with this joint proxy statement/prospectus. This information is available to you without charge upon your request. To obtain timely delivery, you must request the information no later than five business days before the date of the applicable special meeting. You can obtain the documents incorporated by reference into this joint proxy statement/prospectus by requesting them from Two Harbors' or CYS's investor relations departments:

If you are a Two Harbors stockholder:

If you are a CYS stockholder:

D.F. King & Co., Inc. 48 Wall Street, 22nd floor New York, New York 10005 (866) 530-8623 (toll free) two@dfking.com

1290 Avenue of the Americas, 9th Floor New York, New York 10104 866-300-8594 (toll free)

Georgeson LLC

or

or

575 Lexington Avenue Suite 2930 New York, New York 10022 (612) 629-2500 Attention: Investor Relations 500 Totten Pond Road 6th Floor Waltham, Massachusetts 02451 (617) 639-0440 Attention: Investor Relations

Investors may also consult Two Harbors' or CYS's website for more information concerning the Merger and other related transactions described in this joint proxy statement/prospectus. Two Harbors' website is www.twoharborsinvestment.com. CYS's website is www.cysinv.com. Each company's public filings are also available at www.sec.gov. The information contained on Two Harbors' and CYS's websites is not part of this joint proxy statement/prospectus and is not incorporated herein by reference. The references to Two Harbors' and CYS's websites are intended to be inactive textual references only.

If you would like to request any documents that are incorporated by reference into this joint proxy statement/prospectus, please do so by July 20, 2018 in order to receive them before the Two Harbors special meeting and by July 20, 2018 in order to receive them before the CYS special meeting.

For more information, see "Where You Can Find More Information and Incorporation by Reference" beginning on page 212.

ABOUT THIS DOCUMENT

This joint proxy statement/prospectus, which forms part of a registration statement on Form S-4 (Registration Statement No. 333-225242) filed by Two Harbors with the SEC, constitutes a prospectus of Two Harbors for purposes of the Securities Act of 1933, as amended (the "Securities Act"), with respect to (i) the shares of Two Harbors Common Stock to be issued to CYS common stockholders in exchange for shares of CYS Common Stock, (ii) the shares of Two Harbors Series D Preferred Stock to be issued to holders of CYS Series A Preferred Stock in exchange for shares of CYS Series A Preferred Stock and (iii) the shares of Two Harbors Series E Preferred Stock to be issued to holders of CYS Series B Preferred Stock in exchange for shares of CYS Series B Preferred Stock, in each case, pursuant to the Merger Agreement, as such agreement may be amended or modified from time to time. This joint proxy statement/prospectus also constitutes a proxy statement for each of Two Harbors and CYS for purposes of the Securities Exchange Act of 1934, as amended (the "Exchange Act"). In addition, it constitutes a notice of special meeting with respect to the CYS special meeting.

Table of Contents

You should rely only on the information contained or incorporated by reference in this joint proxy statement/ prospectus. No one has been authorized to provide you with information that is different from that contained in, or incorporated by reference into, this joint proxy statement/prospectus. This joint proxy statement/prospectus is dated June 25, 2018, and you should not assume that the information contained in, or incorporated by reference into, this joint proxy statement/prospectus is accurate as of any date other than that date (or, in the case of documents incorporated by reference, their respective dates). Neither the mailing of this joint proxy statement/prospectus to Two Harbors stockholders or CYS stockholders nor the Two Harbors Common Stock Issuance to CYS common stockholders in the Merger pursuant to the Merger Agreement will create any implication to the contrary.

This joint proxy statement/prospectus does not constitute an offer to sell, or a solicitation of an offer to buy, any securities, or the solicitation of a proxy, in any jurisdiction in which or to any person to whom it is unlawful to make any such offer or solicitation in such jurisdiction. Information contained in this joint proxy statement/prospectus regarding Two Harbors has been provided by Two Harbors and information contained in this joint proxy statement/prospectus regarding CYS has been provided by CYS.

Table of Contents

TABLE OF CONTENTS

| QUESTIONS AND ANSWERS ABOUT THE SPECIAL MEETINGS AND THE MERGER | <u>1</u> |
|--|----------------|
| <u>SUMMARY</u> | <u>1</u> 17 |
| The Companies | <u>17</u> |
| The Merger | <u>18</u> |
| The Two Harbors Special Meeting | <u>21</u> |
| The CYS Special Meeting | <u>22</u> |
| Opinion of Two Harbors' Financial Advisor | <u>23</u> |
| Opinion of CYS's Financial Advisor, Barclays Capital Inc. | <u>23</u> |
| Opinion of CYS's Financial Advisor, Credit Suisse Securities (USA) LLC | <u>23</u> |
| Directors and Management of Two Harbors After the Merger | <u>24</u> |
| Interests of Two Harbors Directors and Executive Officers in the Merger | <u>24</u> |
| Interests of CYS's Directors and Executive Officers in the Merger | <u>25</u> |
| Treatment of CYS Restricted Stock | <u>26</u> |
| Fourth Amendment to the Management Agreement | <u>26</u> |
| Conditions to Complete the Merger | <u>26</u> |
| Regulatory Approvals Required for the Merger | <u>27</u> |
| Listing of Two Harbors Common Stock and Deregistration of CYS Common Stock | <u>27</u> |
| Accounting Treatment | <u>27</u> |
| Comparison of Rights of Two Harbors Common Stockholders and CYS Common Stockholders | <u>27</u> |
| Appraisal Rights | <u>27</u> |
| No Solicitation; Change in Recommendations | <u>27</u> |
| <u>Termination of the Merger Agreement</u> | <u>28</u> |
| <u>Termination Fees and Expenses</u> | <u>29</u> |
| <u>Litigation Relating to the Merger</u> | <u>29</u> |
| Material U.S. Federal Income Tax Consequences | <u>31</u> |
| <u>Description of Two Harbors Common Stock</u> | <u>31</u> |
| Selected Historical Financial Information of Two Harbors | <u>32</u> |
| Selected Historical Financial Information of CYS | <u>34</u> |
| Selected Unaudited Pro Forma Condensed Combined Financial Statements | <u>39</u> |
| <u>Unaudited Comparative Per Share Information</u> | <u>41</u> |
| RISK FACTORS | <u>43</u> |
| Risks Related to the Merger | <u>43</u> |
| Risks Related to the Combined Company Following the Merger | <u>47</u> |
| CAUTIONARY STATEMENT REGARDING FORWARD-LOOKING STATEMENTS | <u>52</u> |
| THE COMPANIES | <u>54</u> |
| THE TWO HARBORS SPECIAL MEETING | <u>57</u> |
| PROPOSALS SUBMITTED TO THE TWO HARBORS COMMON STOCKHOLDERS | <u>60</u> |
| Proposal 1: Two Harbors Common Stock Issuance Proposal | <u>60</u> |
| Proposal 2: Two Harbors Adjournment Proposal | <u>60</u> |
| THE CYS SPECIAL MEETING | <u>62</u> |
| PROPOSALS SUBMITTED TO THE CYS COMMON STOCKHOLDERS | <u>65</u> |
| Proposal 1: Merger Proposal | <u>65</u> |
| Proposal 2: CYS Non-Binding Compensation Advisory Proposal | <u>65</u> |
| Proposal 3: CYS Adjournment Proposal | <u>66</u> |
| THE MERGER | <u>67</u> |
| General Description of the Management of the Man | <u>67</u> |
| Background of the Merger | <u>67</u> |
| Recommendation of the Two Harbors Board and Its Reasons for the Merger | <u>79</u> |
| Recommendation of the CYS Board and Its Reasons for the Merger | <u>82</u> |

Table of Contents

| | 0.5 |
|---|-------------------|
| Opinion of Two Harbors' Financial Advisor | <u>85</u> |
| Opinion of CYS's Financial Advisor, Barclays Capital Inc. | 93 |
| Opinion of CYS's Financial Advisor, Credit Suisse Securities (USA) LLC | <u>102</u> |
| Certain Two Harbors Unaudited Prospective Financial Information | <u>111</u> |
| Certain CYS Unaudited Prospective Financial Information | <u>113</u> |
| Directors and Management of Two Harbors After the Merger | <u>116</u> |
| Interests of Two Harbors' Directors and Executive Officers in the Merger | <u>116</u> |
| Interests of CYS's Directors and Executive Officers in the Merger | <u>117</u> |
| Regulatory Approvals Required for the Merger | <u>121</u> |
| Accounting Treatment | <u>121</u> |
| Appraisal Rights | <u>122</u> |
| Exchange of Shares of Stock in the Merger | <u>122</u> |
| <u>Dividends</u> | <u>123</u> |
| <u>Listing of Shares of Stock</u> | <u>123</u> |
| Deregistration of CYS Common Stock and CYS Preferred Stock | <u>123</u> |
| <u>Litigation Relating to the Merger</u> | <u>124</u> |
| THE MERGER AGREEMENT | <u>126</u> |
| The Merger | <u>126</u> |
| Closing: Effective Time of the Merger | <u>126</u> |
| Organizational Documents | <u>126</u> |
| Consideration for the Merger | <u>127</u> |
| Tax Withholding | <u>128</u> |
| No Rights of Objection or Appraisal | <u>129</u> |
| Exchange Procedures | <u>129</u> |
| Representations and Warranties | <u>130</u> |
| Material Adverse Effect | <u>133</u> |
| Conduct of Business by CYS Pending the Merger | 134 |
| Conduct of Business by Two Harbors Pending the Merger | 137 |
| Agreement to Use Reasonable Best Efforts | 139 |
| Competing Proposals | $\frac{140}{140}$ |
| Superior Proposals | <u>141</u> |
| Stockholder Meetings | 142 |
| Stockholder Votes | 143 |
| Directors' and Officers' Indemnification and Insurance | 143 |
| Conditions to Complete the Merger | 143 |
| Termination of the Merger Agreement | <u>145</u> |
| Termination Fees and Expenses | 146 |
| Amendment and Waiver | 149 |
| Specific Performance | 149 |
| FOURTH AMENDMENT TO THE MANAGEMENT AGREEMENT | 150 |
| MATERIAL U.S. FEDERAL INCOME TAX CONSEQUENCES | 151 |
| COMPARATIVE SHARE PRICES AND DIVIDENDS | 177 |
| UNAUDITED COMPARATIVE PER SHARE INFORMATION | 179 |
| DESCRIPTION OF TWO HARBORS CAPITAL STOCK | 180 |
| COMPARISON OF RIGHTS OF TWO HARBORS COMMON STOCKHOLDERS AND CYS COMMON STOCKHOLDERS | <u>197</u> |
| DESCRIPTION OF POLICIES OF TWO HARBORS | 201 |
| PRINCIPAL AND MANAGEMENT STOCKHOLDERS OF TWO HARBORS | 205 205 |
| PRINCIPAL AND MANAGEMENT STOCKHOLDERS OF CYS | <u>207</u> |
| EXPERTS | 209 |
| LEGAL MATTERS | 210 |
| <u> </u> | 210 |

Table of Contents

| STOCKHOLDER PROPOSALS | <u>211</u> | |
|---|------------|--|
| WHERE YOU CAN FIND MORE INFORMATION AND INCORPORATION BY REFERENCE | <u>212</u> | |
| MULTIPLE STOCKHOLDERS SHARING ONE ADDRESS | <u>213</u> | |
| UNAUDITED PRO FORMA CONDENSED COMBINED FINANCIAL STATEMENTS | <u>214</u> | |
| ANNEX A: Agreement and Plan of Merger | | |
| | <u>A-1</u> | |
| ANNEX B: Opinion of Two Harbors' Financial Advisor, JMP Securities LLC | <u>B-1</u> | |
| ANNEX C: Opinion of CYS's Financial Advisor, Barclays Capital Inc. | <u>C-1</u> | |
| ANNEX D: Opinion of CYS's Financial Advisor, Credit Suisse Securities (USA) LLC | <u>D-1</u> | |
| iii | | |
| | | |

Table of Contents

OUESTIONS AND ANSWERS ABOUT THE SPECIAL MEETINGS AND THE MERGER

The following questions and answers are intended to address certain commonly asked questions regarding the Merger Agreement, the Merger and the Two Harbors and CYS special meetings. These questions and answers do not address all questions that may be important to you as a stockholder of Two Harbors or CYS. Please refer to the "Summary" beginning on page 17 and the more detailed information contained elsewhere in this joint proxy statement/prospectus and the annexes to this joint proxy statement/prospectus, which you should read carefully. Unless stated otherwise, all references in this joint proxy statement/prospectus to:

"Alternative Proposal" means any contract, proposal, offer or indication of interest relating to any transaction or series of related transactions involving any merger, amalgamation, share exchange, recapitalization, consolidation, acquisition, business combination of or involving Two Harbors and/or any of its subsidiaries, and any person, in which the consideration paid by Two Harbors or its subsidiaries was cash, voting stock of Two Harbors or other consideration valued at \$500,000,000 or more.

"Barclays" refers to Barclays Capital Inc.

"Closing" refers to the closing of the Merger.

"Code" refers to the Internal Revenue Code of 1986, as amended.

"Combined Company" refers to Two Harbors and its subsidiaries after the closing of the Merger.

"Credit Suisse" refers to Credit Suisse Securities (USA) LLC.

"CYS" refers to CYS Investments, Inc., a Maryland corporation.

"CYS Adjournment Proposal" refers to the proposal to approve the adjournment of the CYS special meeting, if necessary or appropriate, for the purpose of soliciting additional votes for the approval of the Merger Proposal.

"CYS Board" refers to the board of directors of CYS.

"CYS Bylaws" refers to CYS's Amended and Restated Bylaws, as amended from time to time.

"CYS Charter" refers to CYS's Articles of Amendment and Restatement, as amended or supplemented from time to time.

"CYS Common Stock" refers to each outstanding share of common stock, par value \$0.01, per share, of CYS.

"CYS Non-Binding Compensation Advisory Proposal" refers to the non-binding advisory proposal to approve the compensation that may be paid or become payable to CYS's named executive officers that is based on or otherwise relates to the Merger.

"CYS Preferred Stock" refers to each outstanding share of CYS Series A Preferred Stock and CYS Series B Preferred Stock.

"CYS Restricted Stock" means CYS Common Stock that is subject to vesting, repurchase or other lapse restriction.

"CYS Series A Preferred Stock" refers to each outstanding share of 7.75% Series A Cumulative Redeemable Preferred Stock, par value \$0.01 per share, of CYS.

"CYS Series B Preferred Stock" refers to each outstanding share of 7.50% Series B Cumulative Redeemable Preferred Stock, par value \$0.01 per share, of CYS.

1

Table of Contents

"CYS Stock" refers to the CYS Common Stock, CYS Series A Preferred Stock and CYS Series B Preferred Stock, collectively.

"CYS Stock Plan" refers to the CYS 2013 Equity Incentive Plan.

"Determination Date" means the last day of the month immediately preceding the month in which the conditions to Closing are reasonably expected to be satisfied (other than the obtainment of the Two Harbors common stockholder approval or the CYS common stockholder approval and those conditions that by their nature are to be satisfied or waived at the Closing), or such other date as may be mutually agreed by the parties in their respective sole discretions.

"Exchange Ratio" refers to a quotient (rounded to the nearest one ten-thousandth) determined by dividing (i) (a) CYS adjusted book value per share, multiplied by (b) 96.75% by (ii) (a) Two Harbors adjusted book value per share, multiplied by (b) 94.20%, in each case as determined in accordance with the Merger Agreement.

"Fourth Amendment to the Management Agreement" refers to the Fourth Amendment to the Management Agreement between Two Harbors, Two Harbors Operating Company LLC and PRCM Advisers dated April 25, 2018.

"GAAP" refers to the accounting principles generally accepted in the United States of America.

"Granite Point" means Granite Point Mortgage Trust Inc.

"JMP" means JMP Securities LLC.

"Management Agreement" refers to the Management Agreement between Two Harbors, Two Harbors Operating Company LLC and PRCM Advisers dated October 28, 2009, as amended.

"Merger" refers to the merger of Merger Sub with and into CYS, with CYS continuing as the surviving corporation.

"Merger Agreement" refers to the Agreement and Plan of Merger, dated as of April 25, 2018, by and among Two Harbors, Merger Sub, and CYS, as it may be amended or modified from time to time, a copy of which is attached as Annex A to this joint proxy statement/prospectus.

"Merger Proposal" refers to the proposal to approve the Merger.

"Merger Sub" refers to Eiger Merger Subsidiary LLC, a Maryland limited liability company and an indirect wholly owned subsidiary of Two Harbors.

"NYSE" refers to the New York Stock Exchange.

"Per Share Cash Consideration" means \$15,000,000 divided by the sum of the number of shares of CYS Common Stock issued and outstanding immediately prior to the effective time of the Merger (excluding any cancelled shares), including outstanding CYS Restricted Stock that will vest upon completion of the Merger (less any shares surrendered for income tax

purposes).

"Per Share Stock Consideration" means a number of shares of Two Harbors Common Stock equal to the Exchange Ratio.

"PRCM Advisers" refers to PRCM Advisers LLC, Two Harbors' external manager and a wholly owned subsidiary of Pine River.

"Pine River" refers to Pine River Capital Management L.P.

"REIT" refers to a real estate investment trust as defined in Section 856 of the Code.

"Two Harbors" refers to Two Harbors Investment Corp., a Maryland corporation.

2

Table of Contents

"Two Harbors Adjournment Proposal" refers to the proposal to approve the adjournment of the Two Harbors special meeting, if necessary or appropriate, for the purpose of soliciting additional votes for the approval of the Two Harbors Common Stock Issuance Proposal.

"Two Harbors Board" refers to the board of directors of Two Harbors.

"Two Harbors Bylaws" refers to Two Harbors' Amended and Restated Bylaws, as amended from time to time.

"Two Harbors Charter" refers to Two Harbors' Articles of Amendment and Restatement, as amended or supplemented from time to time.

"Two Harbors Common Stock" refers to the common stock, par value \$0.01 per share, of Two Harbors.

"Two Harbors Common Stock Issuance" refers to the issuance of shares of Two Harbors Common Stock to holders of CYS Common Stock, as contemplated by the Merger Agreement, and upon any conversion (upon certain future changes of control of Two Harbors, if any) of the Two Harbors Series D Preferred Stock and Two Harbors Series E Preferred Stock to be issued in the Merger.

"Two Harbors Common Stock Issuance Proposal" refers to the proposal to approve the Two Harbors Common Stock Issuance.

"Two Harbors Series A Preferred Stock" refers to each outstanding share of 8.125% Series A Fixed-to-Floating Rate Cumulative Redeemable Preferred Stock, \$0.01 par value per share, of Two Harbors.

"Two Harbors Series B Preferred Stock" refers to each outstanding share of 7.625% Series B Fixed-to-Floating Rate Cumulative Redeemable Preferred Stock, \$0.01 par value per share, of Two Harbors.

"Two Harbors Series C Preferred Stock" refers to each outstanding share of 7.25% Series C Fixed-to-Floating Rate Cumulative Redeemable Preferred Stock, \$0.01 par value per share, of Two Harbors.

"Two Harbors Series D Preferred Stock" refers to the newly classified 7.75% Series D Cumulative Redeemable Preferred Stock, par value \$0.01 per share, of Two Harbors.

"Two Harbors Series E Preferred Stock" refers to the newly classified 7.50% Series E Cumulative Redeemable Preferred Stock, par value \$0.01 per share, of Two Harbors.

Q: What is the proposed transaction for which I am being asked to vote?

A:

The CYS common stockholders are being asked to approve the Merger. The approval of the Merger by the CYS common stockholders is a condition to the effectiveness of the Merger.

The Two Harbors common stockholders are being asked to approve the Two Harbors Common Stock Issuance Proposal in connection with the Merger. The approval of the Two Harbors Common Stock Issuance Proposal by the Two Harbors common stockholders is a condition to the effectiveness of the Merger.

The CYS common stockholders are being asked to approve the CYS Non-Binding Compensation Advisory Proposal, and the CYS common stockholders and the Two Harbors common stockholders are also being asked to approve the CYS Adjournment Proposal and the Two Harbors Adjournment Proposal, respectively, if necessary. The approval of these proposals is not a condition to the effectiveness of the Merger.

Table of Contents

Q:

Q:

Q: Why are Two Harbors and CYS proposing the Merger?

A:

The Two Harbors Board and the CYS Board have determined that the Merger will provide a number of significant strategic opportunities and benefits and will be in the best interests of their respective stockholders. At Closing, the Combined Company will have a larger capital base, which will support continued growth across Two Harbors' target assets and will position Two Harbors to take advantage of market opportunities as they arise. The Combined Company is expected to provide improved scale, liquidity and capital alternatives for Two Harbors stockholders as a result of the increased equity capitalization and the increased stockholder base of the Combined Company. The combination of Two Harbors and CYS is also expected to create cost efficiencies and decrease Two Harbors' other operating expense ratio by 30 to 40 basis points. To review the reasons for the Merger in greater detail, see "The Merger Recommendation of the Two Harbors Board and Its Reasons for the Merger" beginning on page 79 and "The Merger Recommendation of the CYS Board and Its Reasons for the Merger" beginning on page 82.

Q:

Were appraisals or valuations performed on the assets and liabilities of Two Harbors and CYS in connection with the Merger?

A:

Except for the valuation to be performed on an office property owned by CYS (representing less than 1% of CYS's total assets), no third-party appraisals or valuations on the assets and liabilities of Two Harbors and CYS were obtained in connection with the Merger.

What happens if the market price of Two Harbors Common Stock or CYS Common Stock changes before the Closing?

A:

Changes in the market price of Two Harbors Common Stock or the market price of CYS Common Stock at or prior to the effective time of the Merger will not change the number of shares of Two Harbors Common Stock that CYS common stockholders will receive because the Exchange Ratio is linked to Two Harbors' adjusted book value per share and CYS's adjusted book value per share as of the Determination Date, and not to the market price of either stock.

Q:
 What happens if the adjusted book value per share of Two Harbors or the adjusted book value per share of CYS changes before the Determination Date?

A:

The value of the merger consideration received by CYS common stockholders will depend on the Exchange Ratio and the value of a share of Two Harbors Common Stock at the effective time of the Merger. The Exchange Ratio will be based on Two Harbors' adjusted book value per share and CYS's adjusted book value per share as of the Determination Date. These adjusted book value per share amounts may vary from their respective amounts as of March 31, 2018. As a result, the Exchange Ratio may also vary. As of March 31, 2018, the adjusted book values per share for Two Harbors and CYS, on a pro forma basis, would have been \$15.63 and \$7.41, respectively, representing an illustrative Exchange Ratio of 0.4872, with each share of CYS being exchanged for the right to receive 0.4872 shares of Two Harbors (plus the Per Share Cash Consideration). The actual Exchange Ratio for the Merger will be based on each of the parties' adjusted book values per share as of the Determination Date, and such Exchange Ratio will be publicly announced at least five business days prior to the special meetings.

Are there any conditions to completion of the Merger?

A:
Yes. In addition to the approvals of the Two Harbors common stockholders and the CYS common stockholders, as described herein, there are a number of conditions that must be satisfied or waived for the Merger to be consummated. For a description of all the conditions to the Merger, see "The Merger Agreement Conditions to Complete the Merger" beginning on page 143.

Table of Contents

Q:

The following questions and answers apply to Two Harbors stockholders only:

- Q: When and where is the Two Harbors special meeting?
- A:

 The special meeting of Two Harbors common stockholders will be held on July 27, 2018, at 601 Carlson Parkway, 2nd Floor, Minnetonka, Minnesota 55305, at 9:00 a.m., Central Time.
- Q: What matters will be voted on at the Two Harbors special meeting?
- A:

 Two Harbors common stockholders will be asked to consider and vote on the following proposals:

the Two Harbors Common Stock Issuance Proposal; and

the Two Harbors Adjournment Proposal.

Two Harbors will transact no other business at the Two Harbors special meeting or any adjournment or postponement thereof.

- Q:

 How does the Two Harbors Board recommend that I vote on the proposals?
- A:

 The Two Harbors Board has unanimously (i) determined that the Merger Agreement and the other transactions contemplated therein, including the Merger and the Two Harbors Common Stock Issuance, are in the best interests of Two Harbors and its stockholders, (ii) approved the Merger Agreement and the other transactions contemplated therein, including the Merger and the Two Harbors Common Stock Issuance, (iii) directed that the Two Harbors Common Stock Issuance Proposal be submitted to the holders of Two Harbors Common Stock for consideration at the Two Harbors special meeting and (iv) recommended that the holders of Two Harbors Common Stock approve the Two Harbors Common Stock Issuance Proposal. The Two Harbors Board unanimously recommends that the Two Harbors common stockholders vote "FOR" the Two Harbors Common Stock Issuance Proposal and "FOR" the Two Harbors Adjournment Proposal. For a more complete description of the recommendation of the Two Harbors Board, see "The Merger Recommendation of the Two Harbors Board and Its Reasons for the Merger" beginning on page 79.
- What constitutes a quorum for the Two Harbors special meeting?
- A:

 The presence, in person or by proxy, of the holders of shares of Two Harbors Common Stock entitled to cast a majority of all the votes entitled to be cast at the Two Harbors special meeting will constitute a quorum at the Two Harbors special meeting. Two Harbors will include abstentions in the calculation of the number of shares considered to be present at the Two Harbors special meeting for purposes of determining the presence of a quorum at the Two Harbors special meeting. As of the close of business on June 22, 2018, the record date for the Two Harbors special meeting, there were 175,468,801 shares of Two Harbors Common Stock outstanding.
- Q: What vote is required for Two Harbors common stockholders to approve the Two Harbors Common Stock Issuance Proposal?
- A:

 Approval of the Two Harbors Common Stock Issuance Proposal will require that the number of votes cast for the Two Harbors
 Common Stock Issuance Proposal exceeds the number of votes cast against and abstaining from the Two Harbors Common Stock
 Issuance Proposal, provided a quorum is present.

Holders of Two Harbors preferred stock will not be entitled to vote on any matter at the Two Harbors special meeting.

Table of Contents

- Q: What vote is required for Two Harbors common stockholders to approve the Two Harbors Adjournment Proposal?
- A:

 Approval of the Two Harbors Adjournment Proposal will require that the number of votes cast for the Two Harbors Adjournment Proposal exceeds the number of votes cast against the Two Harbors Adjournment Proposal, provided a quorum is present.
- Q: How are votes counted?
- A:

 For the Two Harbors Common Stock Issuance Proposal, you may vote "FOR", "AGAINST" or "ABSTAIN". If you do not return your proxy card or otherwise authorize a proxy to vote your shares or attend the meeting in person, your shares will not be considered present for the purpose of determining the presence of a quorum and will have no effect on the Two Harbors Common Stock Issuance Proposal. Under NYSE rules, abstentions will be considered as votes cast and, accordingly, will have the same effect as votes "AGAINST" the Two Harbors Common Stock Issuance Proposal.

For the Two Harbors Adjournment Proposal, you may vote "FOR", "AGAINST" or "ABSTAIN". Abstentions and other shares not voted (whether by broker non-votes, if any, or otherwise) will not have an effect on the Two Harbors Adjournment Proposal, provided that a quorum is otherwise present.

Properly executed proxy cards with no instructions indicated on the proxy card will be voted "FOR" the Two Harbors Common Stock Issuance Proposal and "FOR" the Two Harbors Adjournment Proposal.

In addition, banks, brokers and other nominees that hold their customers' shares in street name may not vote their customers' shares on "non-routine" matters without instructions from their customers. As each of the proposals to be voted upon at the Two Harbors special meeting is considered "non-routine," such organizations do not have discretion to vote on any of the proposals. As a result, if you fail to provide your broker, bank or other nominee with any instructions regarding how to vote your shares of Two Harbors Common Stock, your shares of Two Harbors Common Stock will not be considered present at the Two Harbors special meeting and will not be voted on any of the proposals.

- Q: Who is entitled to vote at the Two Harbors special meeting?
- A:

 All holders of Two Harbors Common Stock as of the close of business on June 22, 2018, the record date for the Two Harbors special meeting, are entitled to vote at the Two Harbors special meeting, unless a new record date is fixed for any adjournment or postponement of the Two Harbors special meeting. As of the record date, there were 175,468,801 issued and outstanding shares of Two Harbors Common Stock. Each holder of Two Harbors Common Stock on the record date is entitled to one vote per share.

Holders of Two Harbors preferred stock will not be entitled to vote on any matter at the Two Harbors special meeting.

- Q:

 How will Two Harbors common stockholders be affected by the Merger and the Two Harbors Common Stock Issuance?
- After the Merger, each Two Harbors common stockholder will continue to own the shares of Two Harbors Common Stock that such stockholder held immediately prior to the Merger. As a result, each Two Harbors common stockholder will continue to own common stock in the Combined Company, which will be a larger company with more assets. However, because Two Harbors will be issuing new shares of Two Harbors Common Stock to CYS common stockholders in the Merger, each outstanding share of Two Harbors Common Stock immediately prior to the Merger will represent a smaller percentage of the aggregate number of shares of Two Harbors Common Stock outstanding after the Merger.

Table of Contents

- Q:
 Do the Two Harbors directors and executive officers and its external manager, PRCM Advisers, have any interests in the Merger?
- A:
 Yes. The Combined Company will continue to be managed by PRCM Advisers under the terms of the Management Agreement. Under the Management Agreement, PRCM Advisers provides the day-to-day management of Two Harbors' business, including providing Two Harbors with its executive officers and all other personnel necessary to support its operations. In exchange for its services, Two Harbors pays PRCM Advisers a management fee and reimburses it for certain expenses incurred by it and its affiliates in rendering management services to Two Harbors. Pine River is the parent of PRCM Advisers. Certain directors and executive officers of Two Harbors are partners and employees of Pine River.

Pursuant to the Management Agreement, Two Harbors pays PRCM Advisers a base management fee equal to 1.5% per annum of its stockholders' equity, which is calculated and payable quarterly in arrears. Following the Merger, Two Harbors stockholders' equity will include the additional equity attributable to the acquisition of CYS, thus the amount of the management fees payable to PRCM Advisers will also increase, which gives PRCM Advisers and its parent, Pine River (and therefore, Two Harbors' management), an incentive, not shared by Two Harbors stockholders, to negotiate and effect the Merger, possibly on terms less favorable to Two Harbors than would otherwise have been achieved. However, in connection with the Merger, PRCM Advisers has agreed to amend the Management Agreement to provide for: (i) a reduction in the base management fee PRCM Advisers charges Two Harbors with respect to the additional equity under management resulting from the Merger from 1.5% of stockholders' equity on an annualized basis to 0.75% through the first anniversary of the Closing; (ii) a one-time downward adjustment of \$15,000,000 to the management fees payable by Two Harbors for the quarter in which the Merger occurs in order to reimburse Two Harbors for certain expenses it incurs in connection with the Merger. In the event the total amount of the management fee payable for the quarter referenced in clauses (ii) and (iii) above is less than the aggregate amount of the referenced downward adjustments (collectively, the "Adjustments"), PRCM Advisers will pay to Two Harbors in immediately available funds the difference between (i) such Adjustments and (ii) the base management fee payable to PRCM Advisers with respect to such quarter.

The Fourth Amendment to the Management Agreement between Two Harbors and PRCM Advisers was negotiated between related parties, and the terms, including fees and other amounts payable, may not be as favorable to Two Harbors as if it had been negotiated with an unaffiliated third party.

The following questions and answers apply to CYS common stockholders only:

- Q: What will I receive for my CYS Stock in the Merger?
- Under the terms of the Merger Agreement, each share of CYS Common Stock will be converted into the right to receive (i) the Per Share Cash Consideration and (ii) a number of shares of Two Harbors Common Stock based on the Exchange Ratio, which will be publicly announced at least five business days prior to the earlier of the CYS special meeting and the Two Harbors special meeting. Each share of CYS Series A Preferred Stock will be converted into the right to receive one share of newly classified Two Harbors Series D Preferred Stock. Each share of CYS Series B Preferred Stock will be converted into the right to receive one share of newly classified Two Harbors Series E Preferred Stock.

7

Table of Contents

Q:

A:

A:

Q:

How will I receive the merger consideration if the Merger is completed?

A:

For CYS stockholders, if you hold physical share certificates of CYS Common Stock or CYS Preferred Stock, you will be sent a letter of transmittal promptly after the Closing describing how you may exchange your shares for the merger consideration, and the exchange agent will forward to you the merger consideration to which you are entitled after receiving the proper documentation from you. If you hold your shares of CYS Common Stock or CYS Preferred Stock in uncertificated book-entry form, you are not required to take any specific actions to exchange your shares. After the consummation of the Merger, uncertificated shares of CYS Common Stock and CYS Preferred Stock will be automatically exchanged for the applicable merger consideration. For more information, see the section entitled "The Merger Agreement Exchange Procedures" beginning on page 129.

Q: When and where is the CYS special meeting?

A:
The special meeting of CYS common stockholders will be held on July 27, 2018, at 50 Rowes Wharf, Boston, Massachusetts 02110, starting at 9:00 a.m., Eastern Time.

What matters will be voted on at the CYS special meeting?

You will be asked to consider and vote on the following proposals:

the Merger Proposal;

the CYS Non-Binding Compensation Advisory Proposal; and

the CYS Adjournment Proposal.

CYS will transact no other business at the CYS special meeting or any adjournment or postponement thereof. Holders of CYS Preferred Stock will not be entitled to vote on any matter at the CYS special meeting.

Q: How does the CYS Board recommend that I vote on the proposals?

The CYS Board, acting upon the unanimous recommendation of a special committee of independent directors of CYS formed for the purpose of, among other things, evaluating and making a recommendation to the CYS Board with respect to the Merger Agreement and the other transactions contemplated therein, has unanimously (i) determined that the Merger Agreement and the other transactions contemplated therein, including the merger of Merger Sub with and into CYS, are in the best interests of CYS and its stockholders, (ii) approved the Merger Agreement and declared that the transactions contemplated therein, including the Merger, are advisable, (iii) directed that the Merger and the other transactions contemplated by the Merger Agreement be submitted to the holders of CYS Common Stock for consideration at the CYS special meeting and (iv) recommended that the CYS common stockholders approve the Merger and the other transactions contemplated by the Merger Agreement.

The CYS Board unanimously recommends that the CYS common stockholders vote "FOR" the Merger Proposal, "FOR" the CYS Non-Binding Compensation Advisory Proposal and "FOR" the CYS Adjournment Proposal. For a more complete description of the recommendation of the CYS Board, see "The Merger" Recommendation of the CYS Board and Its Reasons for the Merger" beginning on page 82.

Q:
Do the CYS directors and executive officers have any interests in the Merger?

A:

Yes. In considering the CYS Board's recommendation for CYS stockholders to approve the Merger Proposal and the CYS Non-Binding Compensation Advisory Proposal, CYS stockholders

Table of Contents

Q:

A:

should be aware that directors and executive officers of CYS have interests in the Merger that may be different from, or in addition to, the interests of CYS stockholders generally and that may present actual or potential conflicts of interests. These interests include:

immediately prior to the effective time of the Merger, each outstanding award of CYS Restricted Stock granted pursuant to the CYS Stock Plan will automatically vest in full and any forfeiture restrictions applicable to such shares of CYS Restricted Stock shall immediately lapse. As a result, each share of CYS Restricted Stock (less any shares surrendered for income tax purposes) will be treated as a share of CYS Common Stock for all purposes of the Merger, including the right to receive the merger consideration; and

continued indemnification and insurance coverage for the directors and executive officers of CYS in accordance with the Merger Agreement.

In addition, CYS maintains employment agreements with each of Messrs. Grant, DeCicco, Cleary, and Rosenbloom (the "Employment Agreements"), which provide for payments and other benefits if the individual's employment terminates for a qualifying event or circumstance, such as being terminated without "cause" or leaving employment for "good reason," as these terms are defined in the Employment Agreements. Upon the termination of such individual's employment by CYS or Two Harbors other than for cause, retirement or disability, or by such individual for good reason, the individual would be eligible to receive, among other benefits, (i) a lump sum severance payment equal to 2.5 in the case of Mr. Grant and 1.0 in the case of Messrs. DeCicco, Cleary and Rosenbloom, multiplied by the average of the sum of such individual's base salary and bonus earned during the shorter of (a) the three (3) fiscal years immediately preceding the year in which the termination of employment occurs or (b) the period of time beginning on the date of the individual's employment agreement and ending on the termination date of such individual's employment, (ii) a pro rata bonus for the year of termination, and (iii) certain benefit continuation rights for up to 24 months for Mr. Grant and up to 12 months for Messrs. DeCicco, Cleary, and Rosenbloom, following termination.

In connection with the approval of the execution of the Merger Agreement, the CYS Board approved an amendment to the Employment Agreements to clarify payment mechanics and timing of severance amounts that may become payable pursuant to the Employment Agreements following a qualifying termination of employment with CYS.

Upon Closing, each of James A. Stern and Karen Hammond, independent directors currently sitting on the CYS Board, will be appointed to the Two Harbors Board and each will be entitled to compensation pursuant to Two Harbors' independent director compensation program.

The CYS Board was aware of these interests and considered them, among other matters, when approving the Merger Agreement and the transactions contemplated thereby, including the Merger. For additional information, see "The Merger Interests of CYS's Directors and Executive Officers in the Merger" beginning on page 117.

Q: What constitutes a quorum for the CYS special meeting?

A:

The CYS Bylaws provide that the presence in person or by proxy of CYS stockholders entitled to cast a majority of all the votes entitled to be cast at the meeting constitutes a quorum at each meeting of CYS stockholders. Abstentions will be counted for the purpose of determining a quorum.

What vote is required for CYS common stockholders to approve the Merger Proposal?

Approval of the Merger Proposal will require the affirmative vote of the holders of at least a majority of all outstanding shares of CYS Common Stock entitled to vote on the Merger Proposal,

Table of Contents

which is the only vote of the holders of any class or series of shares of capital stock of CYS required for such approval, provided a quorum is present.

Holders of CYS Preferred Stock will not be entitled to vote on any matter at the CYS special meeting.

- Q: What vote is required for CYS common stockholders to approve the CYS Non-Binding Compensation Advisory Proposal?
- A:

 Approval of the CYS Non-Binding Compensation Advisory Proposal will require the affirmative vote of a majority of the votes cast on the matter by holders of CYS Common Stock, provided a quorum is present, which is the only vote of the holders of any class or series of shares of capital stock of CYS required for such approval.
- Q: What vote is required for CYS common stockholders to approve the CYS Adjournment Proposal?
- A:

 Approval of the CYS Adjournment Proposal will require the affirmative vote of a majority of the votes cast on the matter by holders of shares of CYS Common Stock, provided a quorum is present, which is the only vote of the holders of any class or series of shares of capital stock of CYS required for such approval.
- Q: How are votes counted?
- A:

 For the Merger Proposal, you may vote "FOR", "AGAINST" or "ABSTAIN". If you abstain or fail to return your proxy card, it will have the same effect as a vote "AGAINST" the Merger Proposal.

For the CYS Non-Binding Compensation Advisory Proposal, you may vote "FOR", "AGAINST" or "ABSTAIN". Abstentions and other shares not voted (whether by broker non-votes, if any, or otherwise) will not have an effect on the CYS Non-Binding Compensation Advisory Proposal, provided that a quorum is otherwise present.

For the CYS Adjournment Proposal, you may vote "FOR", "AGAINST" or "ABSTAIN". Abstentions and other shares not voted (whether by broker non-votes, if any, or otherwise) will not have an effect on the CYS Adjournment Proposal, provided that a quorum is otherwise present.

Properly executed proxy cards with no instructions indicated on the proxy card will be voted "FOR" the Merger Proposal, "FOR" the CYS Non-Binding Compensation Advisory Proposal and "FOR" the CYS Adjournment Proposal.

In addition, if your shares are held in the name of a bank, broker or other nominee, your bank, broker or other nominee will not vote your shares in the absence of specific instructions from you on how to vote your shares. These "broker non-votes" (if any) and abstentions will have the same effect as a vote against the Merger Proposal.

- Q: Who is entitled to vote at the CYS special meeting?
- A:

 All holders of CYS Common Stock as of the close of business on June 22, 2018, the record date for the CYS special meeting, are entitled to vote at the CYS special meeting, unless a new record date is fixed for any adjournment or postponement of the CYS special meeting. As of the record date, there were 155,439,713 issued and outstanding shares of CYS Common Stock. Each holder of CYS Common Stock on the record date is entitled to one vote per share. Holders of CYS Preferred Stock will not be entitled to vote on any matter at the CYS special meeting.

Table of Contents

Q:

How will CYS stockholders be affected by the Merger?

Under the terms of the Merger Agreement, holders of CYS Common Stock will receive (i) the Per Share Cash Consideration and (ii) a number of shares of Two Harbors Common Stock for each share of CYS Common Stock owned by them immediately prior to the completion of the Merger based on the Exchange Ratio, which will be publicly announced at least five business days prior to the special meeting of CYS stockholders. As such, after the Merger is completed, CYS Common Stock will no longer be listed on the NYSE and will be deregistered under the Exchange Act, and former CYS common stockholders are expected to own in the aggregate approximately 30% of the Combined Company's fully diluted equity. Also as a result of the Merger, each share of CYS Series A Preferred Stock will be converted into the right to receive one share of newly classified Two Harbors Series D Preferred Stock, and each share of CYS Series B Preferred Stock will be converted into the right to receive one share of newly classified Two Harbors Series E Preferred Stock.

The following questions and answers apply to Two Harbors stockholders and CYS stockholders:

- Q: Have any Two Harbors common stockholders or CYS common stockholders already agreed to vote in favor of the proposals?
- A:

 To either Two Harbors' or CYS's knowledge, no Two Harbors common stockholder has entered into any agreement to vote any of their shares of Two Harbors Common Stock either in favor or against any proposal at the Two Harbors special meeting, and no CYS common stockholder has entered into any agreement to vote any of their shares of CYS Common Stock either in favor or against any proposal at the CYS special meeting.
- Q: What happens if I sell my stock before the special meetings?
- A:

 The record date for each company's special meeting is earlier than the date of each company's special meeting and the date that the Merger is expected to be completed. If you sell your stock after your company's record date but before the date of your company's special meeting, you will retain any right to vote at your company's special meeting, but, for CYS stockholders, you will have transferred your right to receive the merger consideration. For CYS stockholders, in order to receive the merger consideration, you must hold your stock through completion of the Merger.
- Q: What is the difference between a stockholder of record and a beneficial owner?
- A:

 If your shares of Two Harbors Common Stock or CYS Common Stock are registered directly in your name with Two Harbors' or CYS's transfer agent, respectively, you are considered the stockholder of record with respect to those shares.

If your shares of Two Harbors Common Stock or CYS Common Stock are held in a stock brokerage account, or by a bank, trustee or other nominee, you are considered the beneficial owner of shares held in "street name." As the beneficial owner, you have the right to direct your broker, bank, trustee or nominee on how to vote the shares that you beneficially own and you are also invited to attend the applicable special meeting. However, beneficial owners generally cannot vote their shares directly because they are not the stockholder of record; instead, beneficial owners must instruct the broker, bank, trustee or other nominee how to vote their shares.

Table of Contents

Q:

How do I vote?

A:

Stockholders of Record. If you are a stockholder of record of Two Harbors or CYS, you may have your shares of Two Harbors Common Stock or CYS Common Stock voted on the matters to be presented at the applicable special meeting in any of the following ways:

To authorize a proxy through the Internet, visit the website set forth on the proxy card you received. You will be asked to provide the control number from the enclosed proxy card. Proxies authorized through the Internet must be received by 11:59 p.m., Eastern Time, on July 26, 2018.

To authorize a proxy by telephone, dial the toll free telephone number set forth on the proxy card you received using a touch tone phone and follow the recorded instructions. You will be asked to provide the control number from the enclosed proxy card. Proxies authorized by telephone or through the Internet must be received by 11:59 p.m., Eastern Time, on July 26, 2018.

To authorize a your proxy by mail, complete, date and sign each proxy card you receive and return it as promptly as practicable in the enclosed prepaid envelope. If you sign and return your proxy card, but do not mark the boxes showing how you wish to vote, your shares of common stock will be voted "FOR" the Two Harbors Common Stock Issuance Proposal, the Two Harbors Adjournment Proposal, the Merger Proposal, the CYS Non-Binding Compensation Advisory Proposal and the CYS Adjournment Proposal, as applicable.

If you intend to vote in person, please bring proper identification, together with proof that you are a record owner of shares of the applicable company.

Beneficial Owners. If your shares of Two Harbors or CYS are held in "street name," please refer to the instructions provided by your broker, bank, trustee or other nominee to see which of the above choices are available to you. Please note that if you are a holder in "street name" and wish to vote in person at the special meeting, you must obtain a legal proxy from broker, bank, trustee or other nominee. Please also see the question and answer referencing "street name" shares below.

Q:

What happens if I am both a Two Harbors common stockholder and a CYS common stockholder?

A:

If you are both a Two Harbors common stockholder and a CYS common stockholder, you are entitled to vote at the special meeting of each company. You will receive separate proxy cards for each company and must complete, sign and date each proxy card and return each proxy card in the appropriate preaddressed postage-paid envelope or, if available, by authorizing a proxy to vote your shares by one of the other methods specified in your proxy card or voting instruction card for each company.

Q:

If I am a beneficial owner of Two Harbors or CYS shares, will my broker, bank or other nominee vote my shares for me?

A:

No. If you hold your shares in a stock brokerage account or if your shares are held by a bank or other nominee (that is, in "street name"), you must provide your broker, bank or other nominee with instructions on how to vote your shares. Unless you instruct your broker, bank or other nominee to vote your shares held in street name, your shares will **NOT** be voted. You should follow the procedures provided by your bank, broker or nominee regarding the voting of your shares.

Table of Contents

Q: How can I revoke or change my vote?

A:
You may revoke your proxy at any time before the vote is taken at the special meeting of the company of which you are a stockholder in any of the following ways:

authorizing a later proxy by telephone or through the Internet prior to 11:59 p.m., Eastern Time, on July 26, 2018;

filing with the Secretary of the applicable company, before the taking of the vote at the applicable company's special meeting, a written notice of revocation bearing a later date than the proxy card;

duly executing a later dated proxy card relating to the same shares and delivering it to the Secretary of the applicable company before the taking of the vote at the applicable company's special meeting; or

voting in person at the applicable company's special meeting.

Your attendance at the applicable company's special meeting does not automatically revoke your previously submitted proxy. If you have instructed your bank, broker or other nominee to vote your shares, the options described above for revoking your proxy do not apply. Instead, you must follow the directions provided by your bank, broker or other nominee to change your vote.

Q: When is the Merger expected to be consummated?

A:

The Merger is expected to be consummated by the end of the third quarter of 2018, although Two Harbors and CYS cannot assure completion by any particular date, if at all. Because the Merger is subject to a number of conditions, including the approval of the Two Harbors Common Stock Issuance Proposal by the requisite vote of the Two Harbors common stockholders and the Merger Proposal by the requisite vote of the CYS common stockholders, the exact timing of the Merger cannot be determined at this time and Two Harbors and CYS cannot guarantee that the Merger will be completed at all.

Q: Following the Merger, what percentage of Two Harbors Common Stock will current Two Harbors common stockholders and CYS common stockholders own?

Following the completion of the Merger:

A:

A:

the shares of Two Harbors Common Stock held by the current Two Harbors common stockholders are expected to represent in the aggregate approximately 70% of the Combined Company's fully diluted equity; and

former CYS common stockholders are expected to own in the aggregate the remaining approximately 30% of the Combined Company's fully diluted equity.

${\it Q}$: What happens if the Merger is not completed?

If the Two Harbors Common Stock Issuance Proposal or the Merger Proposal is not approved by Two Harbors common stockholders or CYS common stockholders, respectively, or if the Merger is not completed for any other reason, CYS common stockholders will not have their CYS Common Stock exchanged for Two Harbors Common Stock and cash in connection with the Merger. Instead, CYS and Two Harbors would remain separate companies. Under certain circumstances, Two Harbors may be required to pay CYS a termination fee or an expense amount, or CYS may be required to pay Two Harbors a termination fee or expense amount, as described

under "The Merger Agreement Termination Fees and Expenses" beginning on page 146.

Table of Contents

A:

- Q:
 Am I entitled to exercise appraisal rights?
- A:

 No. Neither holders of Two Harbors Common Stock nor holders of CYS Common Stock will be entitled to appraisal rights.
- Q:
 Will Two Harbors have the same business strategy as CYS following the Merger?
- A:

 No. The Combined Company will follow Two Harbors' current business strategy of investing in, financing and managing Agency residential mortgage-backed securities, non-Agency securities, MSR and other financial assets. See "Description of Policies of Two Harbors" on page 201.
- Q: Will my dividend payments continue after the Merger?
- A:

 Following completion of the Merger, holders of Two Harbors Common Stock will be entitled to receive dividend or other distributions when, as and if declared by the Two Harbors Board out of funds legally available therefor.
- Q:

 Are there risks associated with the Merger that I should consider in deciding how to vote?
- A:
 Yes. There are a number of risks related to the Merger that are discussed in this joint proxy statement/ prospectus described in the section entitled "Risk Factors" beginning on page 43.
- Q: What are the material U.S. federal income tax consequences of the Merger to CYS common stockholders and Two Harbors common stockholders?
 - Assuming that the Merger is completed as currently contemplated, Two Harbors and CYS expect that the receipt of (i) cash and Two Harbors Common Stock in exchange for CYS Common Stock, (ii) Two Harbors Series D Preferred Stock in exchange for CYS Series A Preferred Stock, or (iii) Two Harbors Series E Preferred Stock in exchange for CYS Series B Preferred Stock, as applicable, by U.S. stockholders pursuant to the Merger will be a taxable transaction for U.S. federal income tax purposes. Generally, for U.S. federal income tax purposes, U.S. stockholders of CYS Common Stock will recognize gain or loss as a result of the Merger measured by the difference, if any, between (i) the sum of the fair market value of the Two Harbors Common Stock received and the amount of any cash received, and (ii) the stockholder's adjusted tax basis in its CYS Common Stock. In addition, generally, for U.S. federal income tax purposes, U.S. stockholders of CYS Series A Preferred Stock or CYS Series B Preferred Stock will recognize gain or loss as a result of the Merger measured by the difference, if any, between (i) the fair market value of the Two Harbors Series D Preferred Stock or Two Harbors Series E Preferred Stock received, as applicable, and (ii) the stockholder's adjusted tax basis in its CYS Series A Preferred Stock or CYS Series B Preferred Stock, as applicable. Because the consideration to be given to stockholders of (i) CYS Common Stock consists primarily of Two Harbors Common Stock and (ii) CYS Series A Preferred Stock and CYS Series B Preferred Stock consists solely of Two Harbors Series D Preferred Stock and Two Harbors Series E Preferred Stock, respectively, U.S. stockholders of CYS Stock, may need to sell their Two Harbors stock received in the Merger, or raise cash from other sources, to pay any tax obligations resulting from the Merger. Generally, non-U.S. stockholders are not expected to be subject to U.S. federal income tax or U.S. federal withholding tax on any gain recognized from the Merger. See "Material U.S. Federal Income Tax Consequences Consequences of the Merger to Non-U.S. Stockholders of CYS Stock." Two Harbors and CYS anticipate that the Merger will have no material U.S. federal income tax consequences to Two Harbors stockholders who do not own any CYS Stock.

The tax consequences to you of the Merger will depend on your own situation. You should consult your tax advisor for a full understanding of the tax consequences to you of the Merger. For more

Table of Contents

Q:

information regarding the tax consequences of the Merger to CYS stockholders, please see "Material U.S. Federal Income Tax Consequences" beginning on page 151.

Q: How can I obtain additional information about Two Harbors and CYS?

A:

Two Harbors and CYS each file annual, quarterly and current reports, proxy statements and other information with the SEC. Each company's filings with the SEC may be accessed on the Internet at http://www.sec.gov. Copies of the documents filed by Two Harbors with the SEC will be available free of charge on Two Harbors' website at https://www.twoharborsinvestment.com/ or by contacting Two Harbors Investor Relations at investors@twoharborsinvestment.com or at 612-629-2500. Copies of the documents filed by CYS with the SEC will be available free of charge on CYS's website at http://www.cysinv.com/home or by contacting CYS Investor Relations at ir@cysinv.com or at 617-639-0440. The information provided on each company's website is not part of this joint proxy statement/ prospectus and is not incorporated by reference into this joint proxy statement/prospectus. For a more detailed description of the information available and information incorporated by reference, please see "Where You Can Find More Information and Incorporation by Reference" on page 212.

What else do I need to do now?

You are urged to read this joint proxy statement/prospectus carefully and in its entirety, including its annexes and the information incorporated by reference herein, and to consider how the Merger affects you. Even if you plan to attend your company's special meeting, please authorize a proxy to vote your shares by voting via the Internet, telephone or by completing, signing, dating and returning the enclosed proxy card. You can also attend your company's special meeting and vote, or change your prior proxy authorization, in person. If you hold your shares in "street name" through a bank, broker or other nominee, then you should have received this joint proxy statement/prospectus from that nominee, along with that nominee's proxy card which includes voting instructions and instructions on how to change your vote. Please see the question "How do I vote?" on page 12.

Q: Will a proxy solicitor be used?

A:

Yes. Two Harbors has engaged D.F. King & Co., Inc. ("D.F. King"), to assist in the solicitation of proxies for the Two Harbors special meeting, and Two Harbors estimates it will pay D.F. King a fee of approximately \$12,500. Two Harbors has also agreed to reimburse D.F. King for reasonable out-of-pocket expenses and disbursements incurred in connection with the proxy solicitation and to indemnify D.F. King against certain losses, costs and expenses. In addition to mailing proxy solicitation materials, Two Harbors' directors, officers and employees may also solicit proxies in person, by telephone or by any other electronic means of communication deemed appropriate. No additional compensation will be paid to Two Harbors' directors, officers or employees for such services.

CYS has engaged Georgeson LLC ("Georgeson") to assist in the solicitation of proxies for the CYS special meeting, and CYS estimates it will pay Georgeson a fee of approximately \$12,500. CYS has also agreed to reimburse Georgeson for reasonable out-of-pocket expenses and disbursements incurred in connection with the proxy solicitation and to indemnify Georgeson against certain losses, costs and expenses. In addition to mailing proxy solicitation material, CYS's directors, officers and employees may also solicit proxies in person, by telephone or by any other electronic means of communication deemed appropriate. No additional compensation will be paid to CYS's directors, officers or employees for such services.

Table of Contents

Q:

Who can answer my questions?

A:

If you have any questions about the Merger or the other matters to be voted on at the Two Harbors special meeting or the CYS special meeting, how to submit your proxy, or need additional copies of this joint proxy statement/prospectus, the enclosed proxy card or voting instructions, you should contact:

If you are a Two Harbors stockholder:

If you are a CYS stockholder:

D.F. King & Co., Inc. 48 Wall Street, 22nd floor New York, New York 10005 (866) 530-8623 (toll free) two@dfking.com Georgeson LLC 1290 Avenue of the Americas, 9th Floor New York, New York 10104 866-300-8594 (toll free)

16

Table of Contents

SUMMARY

The following summary highlights selected information in this joint proxy statement/prospectus and may not contain all the information that may be important to you with respect to the Merger Agreement, the Merger or the special meetings. Accordingly, you are encouraged to read this joint proxy statement/prospectus, including its annexes and the information incorporated by reference herein, carefully and in its entirety. Each item in this summary includes a page reference directing you to a more complete description of that topic. See also "Where You Can Find More Information and Incorporation by Reference" on page 212.

The Companies

Two Harbors Investment Corp. (Page 54)

Two Harbors Investment Corp. 575 Lexington Avenue Suite 2930 New York, New York 10022 (612) 629-2500

Two Harbors is a Maryland corporation focused on investing in, financing and managing Agency residential mortgage-backed securities, or Agency RMBS, non-Agency securities, mortgage servicing rights, or MSR, and other financial assets, which Two Harbors collectively refers to as its target assets. Two Harbors operates as a REIT and is externally managed by PRCM Advisers.

Two Harbors Common Stock is listed on the NYSE, trading under the symbol "TWO".

Two Harbors' principal executive offices are located at 575 Lexington Avenue, Suite 2930, New York, New York 10022, and its telephone number is (612) 629-2500.

Eiger Merger Subsidiary LLC (Page 55)

Eiger Merger Subsidiary LLC 575 Lexington Avenue Suite 2930 New York, New York 10022 (612) 629-2500

Merger Sub is a Maryland limited liability company that was formed on April 24, 2018 solely for the purpose of effecting the Merger. Upon Closing, the Merger will be consummated whereby Merger Sub will be merged with and into CYS, with CYS continuing as the surviving corporation. Merger Sub has not conducted any activities to date, except for activities incidental to its formation and activities undertaken in connection with the transactions contemplated by the Merger Agreement.

CYS Investments, Inc. (Page 55)

CYS Investments, Inc. 500 Totten Pond Road, 6th Floor Waltham, Massachusetts 02451 (617) 639-0440

CYS is a specialty finance company created with the objective of achieving consistent risk-adjusted investment income. CYS seeks to achieve this objective by investing, on a leveraged basis, in residential mortgage pass-through securities for which the principal and interest payments are guaranteed by the Federal National Mortgage Association, the Federal Home Loan Mortgage Corporation or the Government National Mortgage Association, and collateralized by single-family residential mortgage

Table of Contents

loans ("Agency RMBS"). In addition, CYS's investment guidelines permit investments in collateralized mortgage obligations issued by a government agency or a government-sponsored entity that are collateralized by Agency RMBS, or CMOs, debt securities issued by the U.S. Department of the Treasury or a government-sponsored entity that are not backed by collateral but, in the case of government agencies, are backed by the full faith and credit of the U.S. government, or U.S. Treasury Securities, and, in the case of government sponsored entities, are backed by the integrity and creditworthiness of the issuer, or U.S. Agency Debentures and credit risk transfer securities, such as Structured Agency Credit Risk ("STACR") debt securities issued by Freddie Mac, Connecticut Avenue Securities ("CAS") issued by Fannie Mae and similar securities issued by a GSE where their cash flows track the credit risk performance of a notional reference pool of mortage loans.

CYS was formed as a Maryland corporation on January 3, 2006. CYS has elected to be taxed as a REIT for U.S. federal income tax purposes. The CYS Common Stock, CYS Series A Preferred Stock and CYS Series B Preferred Stock trade on the NYSE under the symbols "CYS", "CYS PrA" and "CYS PrB", respectively.

The Combined Company (Page 55)

The Combined Company will retain the name "Two Harbors Investment Corp." and will continue to be a Maryland corporation, which has elected to be taxed as a REIT under the Code. The Combined Company will be a publicly traded corporation, focused on investing in, financing and managing Agency RMBS, non-Agency securities, MSR, and other financial assets. The Combined Company is expected to have a pro forma equity market capitalization of approximately \$4.0 billion and a total capitalization of approximately \$4.9 billion based on the \$15.76 per share closing price of Two Harbors Common Stock on June 13, 2018. Following the completion of the Merger, the Combined Company will continue to be externally managed by PRCM Advisers.

The business of the Combined Company will be operated through Two Harbors and its subsidiaries, which will include CYS and its subsidiaries. Upon completion of the Merger, the continuing Two Harbors common stockholders are expected to own in the aggregate approximately 70% of the Combined Company's fully diluted equity, and the former CYS common stockholders are expected to own in the aggregate the remaining approximately 30%. CYS preferred stockholders will continue to hold shares of preferred stock of Two Harbors with substantially similar terms following the Merger.

The common stock of the Combined Company will continue to be listed on the NYSE, trading under the symbol "TWO". The newly issued shares of Two Harbors Series D Preferred Stock will trade under the symbol "TWO PRD", and the newly issued shares of Two Harbors Series E Preferred Stock will trade under the symbol "TWO PRE".

The Combined Company's principal executive offices will be located at 575 Lexington Avenue, Suite 2930, New York, New York 10022, and its telephone number will be (612) 629-2500.

The Merger

The Merger Agreement (Page 126)

Two Harbors, Merger Sub and CYS have entered into the Merger Agreement attached as Annex A to this joint proxy statement/prospectus, which is incorporated herein by reference. Two Harbors and CYS encourage you to carefully read the Merger Agreement in its entirety because it is the principal document governing the Merger and the other transactions contemplated by the Merger Agreement.

Table of Contents

The Merger (Page 67)

Subject to the terms and conditions of the Merger Agreement, the Merger will be consummated whereby Merger Sub will merge with and into CYS, with CYS continuing as the surviving corporation. As a result of the Merger, CYS will be an indirect, wholly owned subsidiary of Two Harbors.

Upon completion of the Merger, the continuing Two Harbors common stockholders are expected to own in the aggregate approximately 70% of the Combined Company's fully diluted equity, and the former CYS common stockholders are expected to own in the aggregate the remaining approximately 30%. Once the Merger is consummated, the Combined Company will retain the name "Two Harbors Investment Corp.", will continue to be listed on the NYSE, and its shares will trade under the symbol "TWO".

Consideration for the Merger (Page 127)

Pursuant to the terms and subject to the conditions set forth in the Merger Agreement, at the effective time of the Merger, each outstanding share of CYS Common Stock will be converted into the right to receive from Two Harbors (a) a number of shares of Two Harbors Common Stock equal to the "Exchange Ratio," determined by dividing (i) (a) CYS adjusted book value per share, multiplied by (b) 96.75% by (ii) (a) Two Harbors adjusted book value per share, multiplied by (b) 94.20%, in each case as determined in accordance with the Merger Agreement (the "Per Share Stock Consideration") and (b) \$15,000,000 divided by the sum of the number of shares of CYS Common Stock issued and outstanding immediately prior to the effective time of the Merger (excluding any cancelled shares), including outstanding CYS Restricted Stock that will vest upon completion of the Merger (less any shares surrendered for income tax purposes) (the "Per Share Cash Consideration") pursuant to the Merger Agreement.

Based on the number of shares of CYS Common Stock outstanding on March 31, 2018 and an assumed Exchange Ratio of 0.4872 based on the adjusted book value per share of Two Harbors Common Stock and CYS Common Stock as of March 31, 2018, calculated in accordance with the Merger Agreement, it is expected that approximately 75.7 million shares of Two Harbors Common Stock will be issued in connection with the Merger. The actual Exchange Ratio will be publicly announced at least five business days before the earlier of the special meetings of stockholders described below.

Also at the effective time of the Merger, each outstanding share of CYS Series A Preferred Stock will be converted into the right to receive one share of newly classified Two Harbors Series D Preferred Stock, and each outstanding share of CYS Series B Preferred Stock will be converted into the right to receive one share of newly classified Two Harbors Series E Preferred Stock.

No fractional shares of Two Harbors Common Stock will be issued in the Merger, and the value of any fractional interests to which a holder would otherwise be entitled will be paid in cash.

Recommendation of the Two Harbors Board and Its Reasons for the Merger (Page 79)

On April 25, 2018, following careful consideration, the Two Harbors Board unanimously (i) determined that the Merger Agreement and the other transactions contemplated therein, including the Merger and the Two Harbors Common Stock Issuance, are in the best interests of Two Harbors and its stockholders, (ii) approved the Merger Agreement and the other transactions contemplated therein, including the Merger and the Two Harbors Common Stock Issuance, (iii) directed that the Two Harbors Common Stock Issuance Proposal be submitted to the holders of Two Harbors Common Stock for consideration at the Two Harbors special meeting and (iv) recommended that the holders of Two Harbors Common Stock approve the Two Harbors Common Stock Issuance Proposal. Certain factors considered by the Two Harbors Board in reaching its decision to authorize, approve and adopt the

Table of Contents

Merger Agreement, the Merger and the other transactions contemplated by the Merger Agreement can be found in the section entitled "The Merger Recommendation of the Two Harbors Board and Its Reasons for the Merger" beginning on page 79.

The Two Harbors Board unanimously recommends that Two Harbors common stockholders vote "FOR" the Two Harbors Common Stock Issuance Proposal and "FOR" the Two Harbors Adjournment Proposal.

Recommendation of the CYS Board and Its Reasons for the Merger (Page 82)

On April 25, 2018, after careful consideration, the CYS Board, acting upon the unanimous recommendation of a special committee of independent directors of CYS formed for the purpose of, among other things, evaluating and making a recommendation to the CYS Board with respect to the Merger Agreement and the other transactions contemplated therein, unanimously (i) determined that the Merger Agreement and the other transactions contemplated therein, including the merger of Merger Sub with and into CYS, are in the best interests of CYS and its stockholders, (ii) approved the Merger Agreement and declared that the transactions contemplated therein, including the Merger, are advisable, (iii) directed that the Merger and the other transactions contemplated by the Merger Agreement be submitted to the holders of CYS Common Stock for consideration at the CYS special meeting and (iv) recommended that the CYS common stockholders approve the Merger and the other transactions contemplated by the Merger Agreement. Certain factors considered by the CYS Board in reaching its decision to approve the Merger Agreement, the Merger and the other transactions contemplated by the Merger Agreement can be found in the section entitled "The Merger Recommendation of the CYS Board and Its Reasons for the Merger" beginning on page 82.

The CYS Board unanimously recommends that CYS stockholders vote "FOR" the Merger Proposal, "FOR" the CYS Non-Binding Compensation Advisory Proposal and "FOR" the CYS Adjournment Proposal.

Summary of Risk Factors Related to the Merger (Page 43)

You should carefully consider the following important risks, together with all of the other information included in this joint proxy statement/prospectus and the risks related to the Merger and the related transactions described under the section "Risk Factors" beginning on page 43, before deciding how to vote:

The Merger is subject to a number of conditions which, if not satisfied or waived in a timely manner, would delay the Merger or adversely impact Two Harbors' and CYS's ability to complete the transaction.

Failure to consummate the Merger as currently contemplated or at all could adversely affect the price of Two Harbors Common Stock or CYS Common Stock and the future business and financial results of Two Harbors and CYS.

The Merger Agreement contains provisions that could discourage a potential competing acquirer of either Two Harbors or CYS or could result in any competing acquisition proposal being at a lower price than it might otherwise be.

The pendency of the Merger could adversely affect Two Harbors' and CYS's business and operations.

Following the Merger, the Combined Company may be unable to integrate Two Harbors' business and CYS's business successfully and realize the anticipated synergies or other expected benefits of the Merger on the anticipated timeframe or at all.

Table of Contents

Because the number of shares of Two Harbors Common Stock exchanged per share of CYS Common Stock is not fixed, any change in Two Harbors' adjusted book value per share or CYS's adjusted book value per share prior to setting the Exchange Ratio will affect the number of shares of Two Harbors Common Stock issued by Two Harbors and received by CYS common stockholders at the Closing.

The Merger and related transactions are subject to Two Harbors common stockholder approval and CYS common stockholder approval.

Two Harbors common stockholders and CYS common stockholders will be diluted by the Merger.

If the Merger is not consummated by October 31, 2018, either Two Harbors or CYS may terminate the Merger Agreement.

The market price of Two Harbors Common Stock may decline as a result of the Merger and the market price of Two Harbors Common Stock after the consummation of the Merger may be affected by factors different from those affecting the price of Two Harbors Common Stock or the price of CYS Common Stock before the Merger.

An adverse judgment in any litigation challenging the Merger may prevent the Merger from becoming effective or from becoming effective within the expected timeframe.

Following the Merger, the Combined Company may not pay dividends at or above the rate currently paid by Two Harbors or CYS.

The Combined Company will have a significant amount of indebtedness and may need to incur more in the future.

The Combined Company is expected to incur substantial expenses related and unrelated to the Merger.

The historical and unaudited pro forma condensed combined financial information included elsewhere in this joint proxy statement/prospectus may not be representative of the Combined Company's results after the Merger, and accordingly, you have limited financial information on which to evaluate the Combined Company following the Merger.

The Merger is expected to be taxable to U.S. stockholders of CYS Stock; however, the cash received by CYS stockholders in the Merger might not be sufficient to pay such tax.

Two Harbors would incur adverse tax consequences if it or CYS failed to qualify as a REIT for U.S. federal income tax purposes.

The Two Harbors Special Meeting (Page 57)

Date, Time and Place. The special meeting of Two Harbors common stockholders will be held at 601 Carlson Parkway, 2nd Floor, Minnesonta 55305 on July 27, at 9:00 a.m., Central Time.

Purpose. At the Two Harbors special meeting, Two Harbors common stockholders will be asked to consider and vote upon the Two Harbors Common Stock Issuance Proposal and the Two Harbors Adjournment Proposal.

Record Date; Voting Rights. Two Harbors common stockholders at the close of business on June 22, 2018 are entitled to vote at the Two Harbors special meeting and any adjournments or postponements thereof. Each holder of Two Harbors Common Stock on the record date is entitled to one vote per share.

Table of Contents

Quorum. The presence, in person or by proxy, of the holders of shares of Two Harbors Common Stock entitled to cast a majority of all votes entitled to be cast at the Two Harbors special meeting, will constitute a quorum at the Two Harbors special meeting. Abstentions will be counted for the purpose of determining a quorum.

Required Vote. Approval of the Two Harbors Common Stock Issuance Proposal requires that the number of votes cast for the Two Harbors Common Stock Issuance Proposal exceeds the number of votes cast against and abstaining from the Two Harbors Common Stock Issuance Proposal, assuming a quorum is present. Approval of the Two Harbors Adjournment Proposal also requires that the number of votes cast for the Two Harbors Adjournment Proposal exceeds the number of votes cast against the Two Harbors Adjournment Proposal. Holders of Two Harbors preferred stock will not be entitled to vote on any matter at the Two Harbors special meeting.

As of the close of business on the record date for the Two Harbors special meeting, the directors and executive officers of Two Harbors owned approximately 1.42% of the outstanding shares of Two Harbors Common Stock entitled to vote at the Two Harbors special meeting. Two Harbors currently expects that Two Harbors' directors and executive officers will vote their shares of Two Harbors Common Stock in favor of the Two Harbors Common Stock Issuance Proposal as well as the other proposals to be considered at the Two Harbors special meeting, although none of them are obligated to do so.

Your vote as a Two Harbors common stockholder is very important. Accordingly, please sign and return the enclosed proxy card whether or not you plan to attend the Two Harbors special meeting in person.

The CYS Special Meeting (Page 62)

Date, Time and Place. The special meeting of CYS stockholders will be held at 50 Rowes Wharf, Boston, Massachusetts 02110, on July 27, 2018 at 9:00 a.m., Eastern Time.

Purpose. At the CYS special meeting, the CYS common stockholders will be asked to approve the Merger Proposal, the CYS Non-Binding Compensation Advisory Proposal and the CYS Adjournment Proposal.

Record Date; Voting Rights. CYS stockholders at the close of business on June 22, 2018 are entitled to receive this notice and CYS common stockholders are entitled to vote at the CYS special meeting and any adjournments or postponements thereof. Each holder of record of CYS Common Stock on the record date is entitled to one vote per share.

Quorum. The presence, in person or by proxy of the holders of shares of CYS Common Stock entitled to cast a majority of all the votes entitled to be cast at the CYS special meeting, will constitute a quorum at the CYS special meeting. Abstentions will be counted for the purpose of determining a quorum.

Required Vote. Approval of the Merger Proposal requires the affirmative vote of the holders of a majority of the outstanding shares of CYS Common Stock entitled to vote on the Merger Proposal. Approval of the CYS Non-Binding Compensation Advisory Proposal requires, provided a quorum is present, the affirmative vote of a majority of the votes cast on the matter by holders of shares of CYS Common Stock at the CYS special meeting. Approval of the CYS Adjournment Proposal requires, provided a quorum is present, the affirmative vote of a majority of the votes cast on the matter by holders of shares of CYS Common Stock at the meeting.

As of the close of business on the record date for the CYS special meeting, the directors and executive officers of CYS owned approximately 1.04% of the outstanding CYS Common Stock entitled

Table of Contents

to vote at the CYS special meeting. CYS currently expects that the CYS directors and officers will vote their shares of CYS Common Stock in favor of the Merger Proposal, although none of them are obligated to do so.

Opinion of Two Harbors' Financial Advisor (Page 85)

In connection with the Merger, the Two Harbors Board received a written opinion, dated April 25, 2018, from JMP, as to the fairness, from a financial point of view and as of the date of the opinion, to Two Harbors of the Per Share Stock Consideration (as defined in the Merger Agreement) to be paid by Two Harbors as part of the merger consideration. The full text of JMP's written opinion, which is attached to this joint proxy statement/prospectus as Annex B sets forth the assumptions made, procedures followed, matters considered and limitations on the review undertaken. JMP's opinion was directed and addressed to the Two Harbors Board (in its capacity as such) in connection with its consideration of the Merger. JMP's opinion did not address the underlying decision of the Two Harbors Board to proceed with or effect the Merger or the relative merits of the Merger as compared to any alternative strategy or transaction that might exist for Two Harbors. JMP's opinion does not constitute a recommendation as to how the Two Harbors Board or any Two Harbors common stockholder should act or vote with respect to the Merger or any other matter.

Opinion of CYS's Financial Advisor, Barclays Capital Inc. (Page 93)

Barclays was engaged to act as a financial advisor to the CYS board in connection with a potential transaction involving CYS. At the CYS board meeting on April 25, 2018, Barclays rendered its oral opinion (which was subsequently confirmed in writing) to the CYS board that, as of such date and based upon and subject to the qualifications, limitations and assumptions set forth in the written opinion, the merger consideration to be offered to the holders of CYS common stock in the merger was fair, from a financial point of view, to such holders.

The full text of Barclays' written opinion, dated as of April 25, 2018, is attached to this joint proxy statement/prospectus as Annex C and incorporated by reference herein. Barclays' written opinion sets forth, among other things, the assumptions made, procedures followed, factors considered and limitations upon the review undertaken by Barclays in rendering its opinion. You are encouraged to read the opinion carefully in its entirety. The summary of Barclays' opinion set forth in this joint proxy statement/prospectus is qualified in its entirety by reference to the full text of the opinion. Barclays' opinion is addressed to the CYS board, addresses only the fairness, from a financial point of view, of the merger consideration to be offered to the holders of CYS common stock and does not constitute a recommendation to any stockholder of CYS as to how such stockholder should vote with respect to the merger or any other matter.

For more information, see "The Merger Opinion of CYS's Financial Advisor, Barclays Capital Inc." beginning on page 93 and Annex C.

Opinion of CYS's Financial Advisor, Credit Suisse Securities (USA) LLC (Page 102)

CYS has engaged Credit Suisse to act as a financial advisor to CYS in connection with the proposed merger. In connection with this engagement, Credit Suisse delivered an opinion, dated April 25, 2018, to the CYS board as to the fairness, from a financial point of view and as of the date of such opinion, of the merger consideration to be received by holders of CYS common stock (other than excluded holders (as defined below)) pursuant to the merger agreement. For purposes of Credit Suisse's analyses and opinion, the term "excluded holders" refers to, collectively, CYS, Two Harbors, Merger Sub and any of their respective wholly owned subsidiaries.

Table of Contents

The full text of Credit Suisse's written opinion, dated April 25, 2018, is attached to this joint proxy statement/prospectus as Annex D and sets forth, among other things, the assumptions made, procedures followed, matters considered and limitations and qualifications on the review undertaken by Credit Suisse in connection with such opinion. The description of Credit Suisse's opinion set forth in this joint proxy statement/prospectus is qualified in its entirety by reference to the full text of Credit Suisse's opinion. Credit Suisse's opinion was provided to the CYS board (in its capacity as such) for its information in connection with its evaluation of the merger consideration from a financial point of view and did not address any other terms, aspects or implications of the proposed merger, the relative merits of the proposed merger or related transactions as compared to alternative transactions or strategies that might be available to CYS or the underlying business decision of the CYS board or CYS to proceed with the proposed merger or related transactions. Credit Suisse's opinion does not constitute advice or a recommendation to any stockholder as to how such stockholder should vote or act on any matter relating to the proposed merger or otherwise.

For more information, see "The Merger Opinion of CYS's Financial Advisor, Credit Suisse Securities (USA) LLC" beginning on page 102 and Annex D.

Directors and Management of Two Harbors After the Merger (Page 116)

Following the consummation of the Merger, the number of directors on the Two Harbors Board will be increased to eleven, and will include all of the current nine directors of the Two Harbors Board and two additional independent directors from the CYS Board: James A. Stern and Karen Hammond. Each of the executive officers of Two Harbors immediately prior to the effective time of the Merger will continue as an executive officer of the Combined Company following the effective time of the Merger.

Interests of Two Harbors Directors and Executive Officers in the Merger (Page 116)

In considering the recommendation of the Two Harbors Board to approve the Two Harbors Common Stock Issuance, Two Harbors common stockholders should be aware that directors and executive officers of Two Harbors have certain interests in the Merger that may be different from, or in addition to, the interests of Two Harbors common stockholders generally and that may present actual or potential conflicts of interests. The Two Harbors Board was aware of these interests and considered them, among other matters, in reaching its decision to approve the Merger Agreement and the transactions contemplated thereby.

The Combined Company will continue to be managed by PRCM Advisers under the terms of the Management Agreement. Under the Management Agreement, PRCM Advisers provides the day-to-day management of Two Harbors' business, including providing Two Harbors with its executive officers and all other personnel necessary to support its operations. In exchange for its services, Two Harbors pays PRCM Advisers a management fee as well as reimburses it for certain expenses incurred by it and its affiliates in rendering management services to Two Harbors. Pine River is the parent of PRCM Advisers. Certain directors and executive officers of Two Harbors are partners and employees of Pine River.

Pursuant to the Management Agreement, Two Harbors pays PRCM Advisers a base management fee equal to 1.5% per annum of its stockholders' equity, which is calculated and payable quarterly in arrears. Following the Merger, Two Harbors stockholders' equity will include the additional equity attributable to the acquisition of CYS, thus the amount of the management fees payable to PRCM Advisers will also increase, which gives PRCM Advisers and its parent, Pine River (and therefore, Two Harbors' management), an incentive, not shared by Two Harbors stockholders, to negotiate and effect the Merger, possibly on terms less favorable to Two Harbors than would otherwise have been achieved. However, in connection with the Merger, PRCM Advisers has agreed to amend the Management